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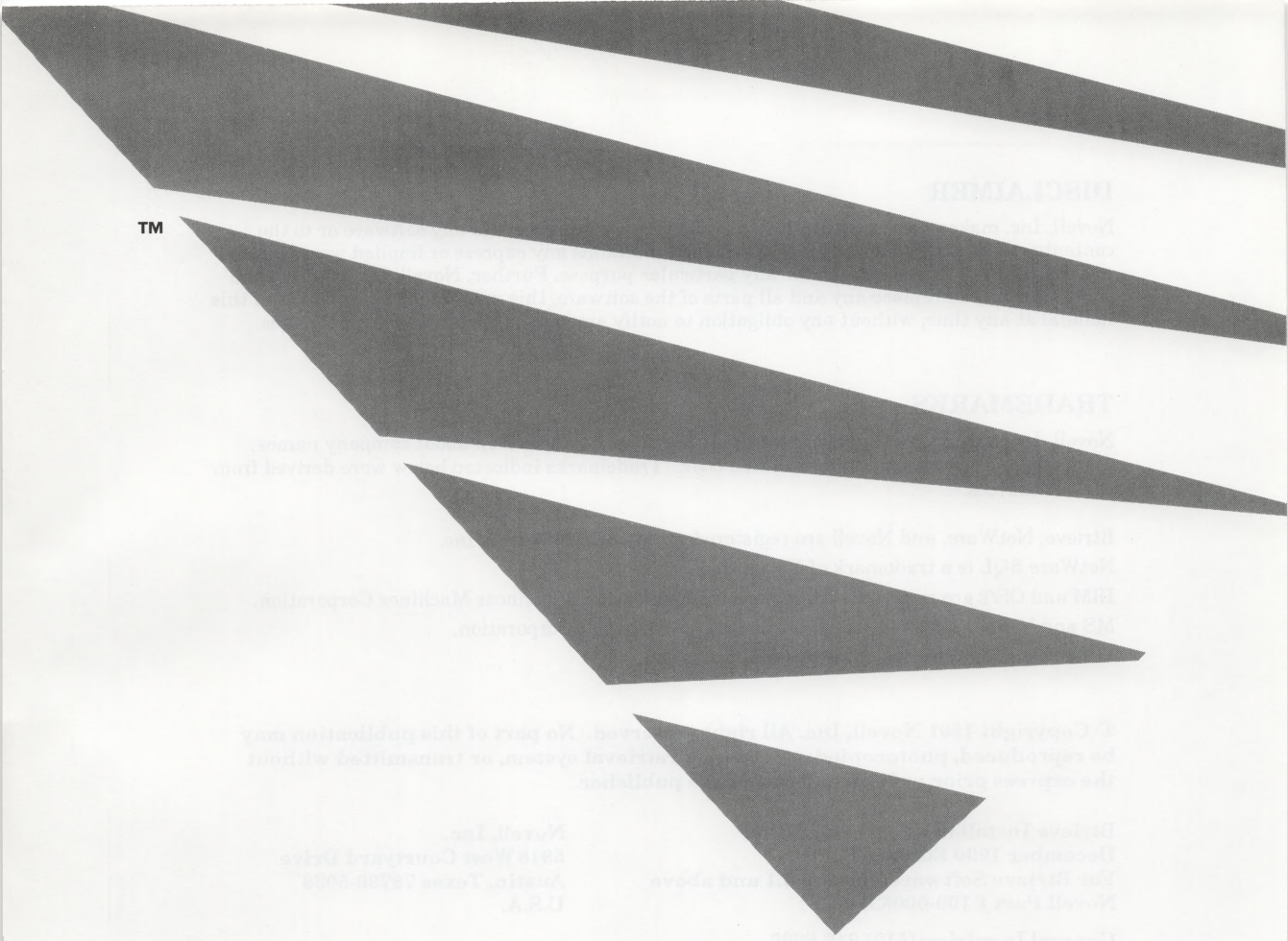
Btrieve®

Installation and Operation

NetWare®



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HOW TO USE THIS MANUAL

The *Btrieve Installation and Operation* manual explains installing and operating the Btrieve Record Management System in the NetWare environment. This manual addresses the needs of system administrators who are responsible for maintaining Btrieve databases on a network. It will also be useful to programmers, systems developers, and systems integrators who are using Btrieve to develop workstation applications and Value-Added Processes (VAPs) for the NetWare operating environment .

This section describes the organization of this manual, the notational conventions used to denote command codes and parameters, and the associated documents that you will use in conjunction with this manual.

Chapter 1 "Introduction" provides an overview of NetWare Btrieve, an explanation of Btrieve features, and a brief introduction to the Btrieve utilities.

Chapter 2 "Btrieve Architecture" discusses the architecture of the Btrieve programs and how these programs are used to create VAPs that use BSERVER to access network files.

Chapter 3 "Installation" outlines system requirements, explains how to run BSETUP to configure Btrieve, and discusses starting and stopping the Btrieve requester programs for the various operating environments.

Chapter 4 "Utilities" describes the console commands, the BCONSOLE utility, and the BROLLFWD utility included with NetWare Btrieve.

Appendix "Status Codes and Messages" lists and discusses the status codes returned by Btrieve and the status codes error messages returned by BROUTER, BSERVER, and the Btrieve requester programs.

At the end of this manual is a glossary of Btrieve related terms and an index for quick reference.

NOTATIONAL CONVENTIONS

This manual uses the following notational conventions:

[ ]	Items enclosed in square brackets are optional.
< >	Multiple required items are enclosed in angle brackets.
Item	Single required items are not enclosed in brackets.
|	The vertical bar character represents the word *or*. You can enter either the value preceding the vertical bar or the value following it, but not both.
variable	Items in italics represent variable parameter values that you define in Btrieve.
COMMAND	Commands are shown in uppercase letters.

ASSOCIATED DOCUMENTS

This manual explains how to install Btrieve and use the Btrieve utilities in a NetWare environment. To develop applications that use the Btrieve Record Manager, refer to the *Btrieve Programmer's Manual*.

For more information on the Btrieve Application Program Interface, methods of accessing NetWare Btrieve, and other programming issues, contact the Marketing Support Group of Novell's Development Products Division at 1-512-346-8380. Within the U.S. you can call the toll-free number 1-800-RED-WORD (1-800-733-9673).

TABLE OF CONTENTS

1 Introduction

Overview 1-1
Btrieve Features 1-3
Index Maintenance 1-3
File Specifications 1-3
Memory Management 1-3
Data Integrity 1-4
Data Security 1-5
Btrieve Utilities 1-5

2 Btrieve Architecture

Overview of Btrieve Programs 2-1
BSERVER 2-1
Btrieve Requester 2-2
BROUTER 2-2
Accessing BSERVER 2-2
Client-Based Applications 2-3
Server-Based Applications 2-5
Creating Value-Added Processes 2-5

3 Installation

Installation Overview 3-1
System Requirements 3-2
Starting BSETUP 3-3
Using BSETUP Menu Options 3-3
Change File Server 3-4
Set Configuration 3-4
Number of Open Files 3-6
Number of Handles 3-6
Number of Locks 3-6
Number of Transactions 3-7
Number of Files Per Transaction 3-7

Largest Compressed Record Size 3-7
Largest Record Size 3-8
Largest Page Size 3-8
Number of Sessions 3-8
Console Refresh Count 3-8
Create Files as Transactional 3-9
Logging of Selected Files 3-9
Save Configuration 3-9
Install Btrieve 3-9
Remove Btrieve 3-11
Running the Requester Programs 3-12
Start-Up Options 3-12
Mapped Drives Option (/R) 3-12
Data Message Length Option (/D) 3-12
Number of File Servers Option (/S) 3-13
Starting the DOS Requester 3-13
Starting the OS/2 Requester 3-13
Installing the OS/2 Requester 3-13
Initializing the OS/2 Requester 3-14
Using BREQUEST with MS-Windows 3-15
Stopping the Requesters 3-16
Stopping Btrieve 3-17

4 Utilities

Console Commands 4-1
B ACTIVE 4-2
B DOWN 4-3
B OFF 4-4
B RESET 4-5
B STATUS 4-6
B USAGE 4-8
BCONSOLE Utility 4-9
Active Files 4-9
Change Current File Server 4-9
Resource Usage 4-10
Status 4-11
VAP User List 4-12
BROLLFWD Utility 4-12
Specifying Logging 4-12
Running BROLLFWD 4-14

Appendix: Status Codes and Messages

Btrieve Status Codes A-1
DOS Requester Error Messages A-17
OS/2 Requester Error Codes A-18
MS-Windows Requester Error Codes A-19
BSERVER and BROUTER Error Messages A-20

Glossary

Index

LIST OF FIGURES

Figure 1.1 Multienvironmental Btrieve 1-2

Figure 2.1 Network Configuration Using BSERVER 2-3

Figure 3.1 BSETUP Menu 3-3

Figure 3.2 Set Configuration Menu 3-5

Figure 3.3 MS-Windows Workstation Using BREQUEST 3-15

Figure 4.1 B STATUS Menu 4-6

Figure 4.2 B USAGE Menu 4-8

Figure 4.3 BCONSOLE Resource Usage Screen 4-10

Figure 4.4 BCONSOLE Status Screen 4-11

1 INTRODUCTION

NetWare Btrieve is a complete key-indexed record management system designed for high-performance data handling and improved programming productivity. Btrieve operations allow your application to retrieve, insert, update, or delete records by key value, or by using sequential or random access methods. Btrieve is implemented as a self-contained executable program that your application can access via function calls.

OVERVIEW

Btrieve can run on either a workstation (client-based version) or a server (server-based version). The client-based version of Btrieve executes all processing on the workstation. It accesses all files through operating system calls. These operating system calls are either executed locally (for local files) or redirected to the server (for server files).

In the server-based version, the Btrieve Record Manager runs on the server and a Btrieve requester program runs on the workstation. Btrieve requester programs are available for DOS, OS/2, and Windows workstations. The requester program handles data I/O between the workstation and the network server. The Btrieve Record Manager running on the server handles data I/O with the file system.

The server-based version of Btrieve runs on a Novell NetWare server. The client-based version can run under several operating systems including DOS, OS/2, and Windows. Applications written for the client-based version of Btrieve will run on the server-based version and vice versa.

This manual documents the server-based version of Btrieve running on a Novell NetWare server. NetWare Btrieve is a server-based implementation of Btrieve that operates under NetWare v2.1 or above.

In addition to providing a server-based record management system for workstation applications, NetWare Btrieve also accepts calls from other server-based applications.

Figure 1.1 shows a multienvironmental Btrieve network. Each of the three different workstation environments can access any of the file servers on the network. Their respective Btrieve requester programs communicate with NetWare Btrieve loaded at the desired file server.

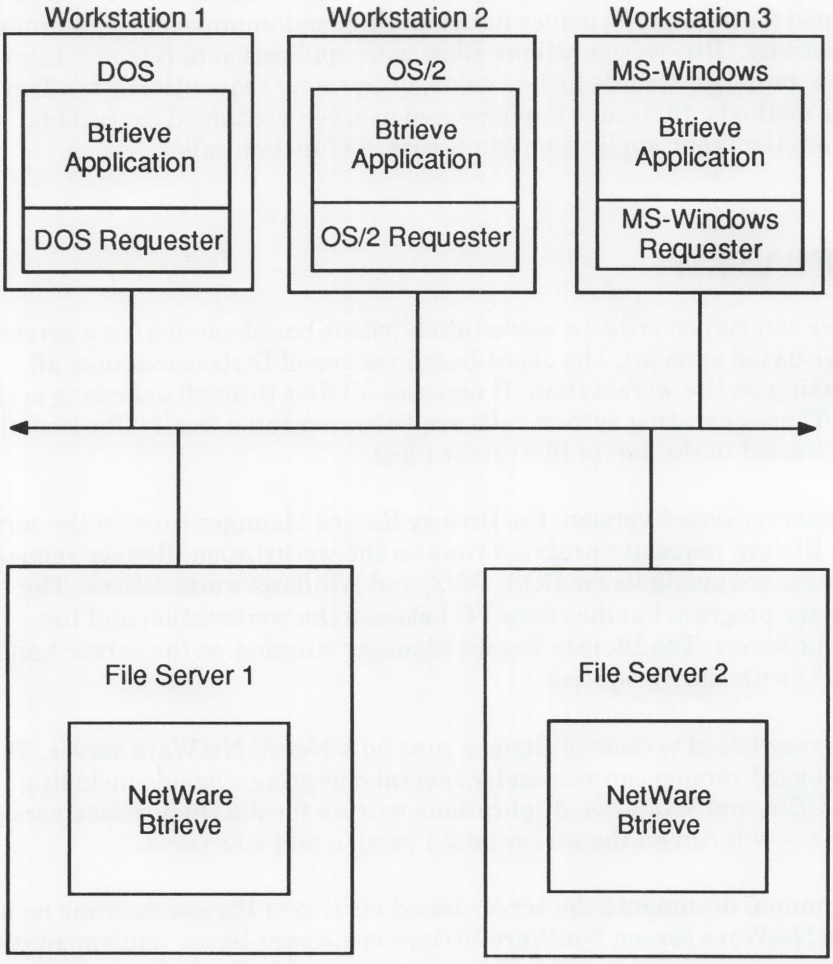

Figure 1.1
Multienvironmental Btrieve

BTRIEVE FEATURES

The following sections introduce some of the features that make Btrieve a uniquely powerful record management system.

INDEX MAINTENANCE

Btrieve automatically creates and maintains the indexes in your files as you insert, update, and delete records. In addition to automatic index maintenance, Btrieve supports the following index features:

- Up to 24 indexes per file
- Adding or dropping supplemental indexes after a file has been created
- 14 different data types (any of which may be used for keys)
- Unique, duplicate, modifiable, nonmodifiable, segmented, null, manual, ascending, and descending key types

FILE SPECIFICATIONS

Btrieve allows you to create data files by using function calls from your application or with the BUTIL utility provided.

Btrieve offers you the following file specification features:

- File sizes up to 4 billion bytes
- The number of records limited only by the size of the file
- Ability to extend a file across two storage devices (except in a NetWare 386 environment)
- Consistent file definition and management routines
- Consistent file structures

MEMORY MANAGEMENT

Btrieve allows you to specify the amount of memory used by the I/O cache buffers based on your application's memory requirements and the total amount of memory installed (on your workstation for client-based Btrieve or on your server for server-based Btrieve). The amount of memory you reserve for the I/O cache buffer allows you to maximize Btrieve's performance.

The cache is an area of memory that Btrieve reserves for buffering the pages that it reads. The cache is divided into a number of buffers, each of which should be the size of the largest page your application will access. Btrieve calculates this size using the maximum page size and memory options you define when you configure Btrieve. Generally, a larger cache improves performance because it allows more pages to be in memory at a given time.

When your application makes a request for a record, Btrieve first checks the cache to see if the page containing the record is already in memory. If the record is already in cache, Btrieve transfers the record from the cache to your application's data buffer. If the page is not in the cache, Btrieve reads the page from the disk into a cache buffer before transferring the requested record to your application.

If every cache buffer is full when Btrieve needs to transfer a new page into memory, a least recently used (LRU) algorithm determines which page in cache Btrieve needs to overlay. The LRU algorithm reduces processing time by keeping the most recently referenced pages in memory.

When your application inserts or updates a record, Btrieve first modifies the page in cache and then writes the page to disk. The modified page remains in cache until the LRU algorithm determines that it can be overwritten with a new page.

DATA INTEGRITY

Btrieve uses the following techniques to support concurrent access and ensure the integrity of your files:

- Single and multiple record-level locks
- File-level locks
- Transaction specification
- Deadlock detection (in a server-based environment)
- Pre-image files for storing images of file pages before records are inserted, updated, or deleted
- Logging and Rollforward processes to record operations and recover data corrupted by a system or server failure

DATA SECURITY

Btrieve provides you with the following capabilities for enhancing data security:

- Assigning owner names to files
- Specifying dynamic encryption and decryption of data

BTRIEVE UTILITIES

The Btrieve program diskette provides utilities for monitoring network activity and for managing and recovering Btrieve files. These utilities are as follows:

- BCONSOLE is a menu-driven utility that monitors the activity of any Btrieve VAP on the network from a workstation.
- BROLLFWD is a utility for recovering files.

The Btrieve utilities are described in Chapter 4, "Utilities."

2 BTRIEVE ARCHITECTURE

This chapter discusses the architecture of NetWare Btrieve as it relates to the Btrieve programs, accessing BSERVER, and creating VAPs.

OVERVIEW OF BTRIEVE PROGRAMS

There are three basic programs in the NetWare Btrieve package. These programs are as follows:

- BSERVER
- The Btrieve requester
- BROUTER

BSERVER is the core program of NetWare Btrieve and runs on the file server. Client-based applications using NetWare Btrieve communicate with BSERVER through the requester. Server-based applications communicate with BSERVER through BROUTER.

BSERVER

BSERVER is NetWare Btrieve's Record Manager. BSERVER should be loaded at every file server that stores Btrieve files. BSERVER handles specific Btrieve requests and contains a server shell and a network communications module. BSERVER handles the following tasks:

- Performs all disk I/O for the Btrieve files stored at the server where it resides.
- Issues and releases all record- and file-level locks at the server where it resides.
- Packages all Btrieve requests it processes for transmittal either to a copy of the Btrieve requester at a workstation or to a copy of BROUTER at another server.
- Logs all Btrieve requests that result in changes to a file, if logging is required for the file. (For more information on logging, see "BROLLFWD Utility" in Chapter 4, "Utilities.")

BTRIEVE REQUESTER

The Btrieve requester must be loaded at each workstation that makes Btrieve requests. Workstation applications communicate with BSERVER via the requester. The requester handles the following tasks:

- Receives Btrieve requests from an application and relays them to BSERVER on the proper file server.
- Returns the results of the Btrieve requests to the application.

BROUTER

BROUTER loads at a file server. It is a server-based application that allows other server-based applications loaded on file servers to communicate with BSERVER. BROUTER performs the following tasks:

- Provides a high-performance memory-to-memory interprocess communication method between BSERVER and other server-based applications that reside on the same file server.
- Provides conventional SPX-based access to other server-based applications that reside on other file servers in the network.
- Maintains a unique system identification code for each application so that locks, transactions, and other access control mechanisms can work without conflict across the entire network.
- Serializes Btrieve requests to BSERVER so that multiple server-based applications can use BSERVER without conflict.

ACCESSING BSERVER

The NetWare Btrieve programs function as if they were a subroutine of an application. NetWare Btrieve supports the following two methods for accessing BSERVER:

- A client-based application can access BSERVER via a Btrieve requester.
- A server-based application can access BSERVER via BROUTER.

These two methods of access are described in the following sections.

CLIENT-BASED APPLICATIONS

Client-based applications run on workstations and communicate with BSERVER via the requester. The following steps illustrate the flow of control when a client-based application accesses BSERVER via the requester.

1. Your application issues a Btrieve request using a function call.
2. Your application passes control to a short interface routine that packages the call parameters in a block of memory, saves the source stack, and makes the call to the requester. This interface is provided with NetWare Btrieve.
3. The requester packages the request into a network message, determines which server should receive the request, and routes the message to the BSERVER program that is resident at that server.
4. BSERVER receives the network message, validates the parameters, and then executes the request. Depending on the nature of the request, this could involve a memory-only operation or an I/O operation to a system storage device. BSERVER then returns the results of the operation to the requester at the workstation.
5. The requester returns the appropriate data and status code to the parameter variables in your application's memory, restores the source stack, and returns control to your application.

Figure 2.1 illustrates a sample configuration for a simple Novell network using NetWare Btrieve.

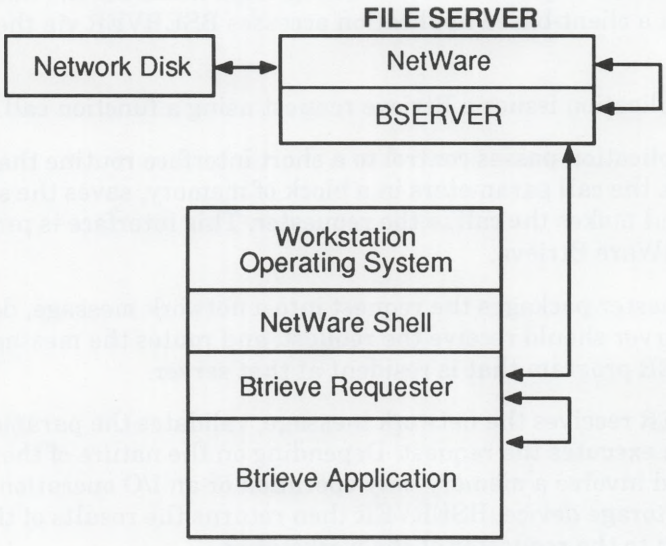

Figure 2.1
Network Configuration Using BSERVER

If you are using multiple file servers or an internetwork, all of the file servers do not have to be online when you start the requester at the workstations. The requester recognizes new file servers or drives when you attach to a new file server or change your network drive mappings.

The maximum number of file servers and drive mappings is set when the requester is loaded. You can change the number of file servers and drive mappings by reloading the requester at your workstation using the /S and /R options. Refer to Chapter 3, "Installation," for more information on configuring the requester program.

SERVER-BASED APPLICATIONS

Server-based applications run on the server and communicate with BSERVER via BROUTER. A server-based application created in a NetWare 286 environment is called a Value-Added Process (VAP). You must create an interface routine so that your VAP can access Btrieve. The following steps describe the flow of control when a VAP accesses BSERVER via BROUTER.

1. Your VAP issues a Btrieve request using a function call.
2. A short interface routine in your VAP packages the call parameters into a Btrieve parameter block and executes the 7B hex interrupt.
3. BROUTER receives the Btrieve request, establishes the caller's identity, and routes it to the appropriate BSERVER.
4. BSERVER processes the request and returns the results of the operation to BROUTER.
5. BROUTER returns the appropriate data and status code to the VAP's memory designated by the Btrieve parameter block. Control is then returned to the VAP.

CREATING VALUE-ADDED PROCESSES

If you are writing a VAP that uses Btrieve files, you must modify the interface to communicate with BROUTER in the server environment. Modify the interface as described in the following procedure:

1. Check for BROUTER to see if it is loaded. Issue the NetWare Get Interrupt Vector function call to determine whether BROUTER is loaded. If the vector for the 7B interrupt is zero, BROUTER is not loaded.
2. Store the Btrieve parameter block in memory in the format expected by NetWare Btrieve.
3. Store the address of the Btrieve parameter block in the DS:DX registers.
4. Store a unique two-character ASCII identifier in the BX register to identify your VAP to BROUTER. This identifier distinguishes your VAP from any other VAP that accesses BROUTER. If the value passed to the BX register is greater than or equal to A (4100 hex), then BCONSOLE treats the value as two initials when it is displayed on the screen.

NOTE:

Reverse the bytes of the unique two-character identifier before storing them in the BX register since the byte order of the BX register is reversed after it is passed.

For example, NetWare SQL always stores "SN" in the BX register, therefore the VAP ID for SQL appears as "NS" in the BCONSOLE utility.

---

5. Store a unique 2-byte identification number in the AX register (prior to performing the 7B interrupt). Your VAP must specify this unique identification number to establish a caller's identity. This number can be used as the ClientID if your VAP manages calls to Btrieve for two or more clients. You must provide this number to BROUTER for concurrency and transaction processing purposes. For example, NetWare SQL passes the index of the table it uses to register clients.
6. Perform the 7B interrupt that transfers control from your VAP to BROUTER.

Contact the Novell Development Products Division to obtain the identifier for your VAP. The address of the Novell Development Products Division is

Novell, Incorporated
Development Products
5918 West Courtyard Drive
Austin, Texas 78730-5036

If the Btrieve request is made to the local NetWare Btrieve VAP, BROUTER performs an interrupt that uses the same parameters. The operation is processed locally and the result is placed directly into the caller's work space before returning control to your application.

If the Btrieve request is made to a NetWare Btrieve NLM or VAP that resides on another file server, BROUTER acts like the requester and performs an SPX request. The result is then unformatted and copied into the caller's work space before returning control to your application.

3 INSTALLATION

This chapter contains the following sections:

- Installation Overview
- System Requirements
- Starting BSETUP
- Using BSETUP Menu Options
- Running the Requester Programs
- Stopping Btrieve

To install and configure Btrieve, read "Installation Overview," "System Requirements," "Starting BSETUP," and "Using BSETUP Menu Options." If you are running Btrieve on a workstation, you must also read "Running the Requester Programs." To stop Btrieve, read the section "Stopping Btrieve" at the end of this chapter.

INSTALLATION OVERVIEW

Before an application can access NetWare Btrieve, you must use the BSETUP utility to configure the Btrieve programs BSERVER and BROUTER and then install these programs on a file server. The BSETUP program allows you to install Btrieve on more than one server in a session.You can install BSERVER and BROUTER on a file server if you are logged in as Supervisor or have Supervisor rights.

The following is a summary of the procedures involved in installing and configuring Btrieve:

1. Copy the following files from the Btrieve diskette to the current directory:
   - BSETUP
   - BSERVER
   - BROUTER (required for communicating with any other VAP that can make Btrieve calls)
   - The Btrieve requester (required for workstations communicating with the server)

2. Start BSETUP from a DOS workstation.
3. Execute the Change File Server option on the BSETUP Available Options menu in order to choose the name of the server on which you want to install Btrieve.
4. Use the Set Configuration option on the Available Options menu to set the various configuration options.
5. Use the Save Configuration option on the Available Options menu to save the various configuration options.
6. Use the Install Btrieve option on the Available Options menu to complete the installation of Btrieve.
7. If you are running Btrieve on workstations, you will also need to start and run the Btrieve requester programs.

When you run BSETUP, Btrieve will copy the program files from the current directory (using the last saved configuration) to the SYS:SYSTEM directory for the server displayed on the screen. You cannot modify the configuration options directly using the program files in SYS:SYSTEM. To modify the configuration, you must run BSETUP again.

SYSTEM REQUIREMENTS

The following list provides the requirements for running NetWare Btrieve at the server:

- NetWare v 2.1*x* or above
- Network file server with enough memory to load NetWare, BSERVER, and BROUTER (typically 2MB).

When you install Btrieve, you install either BSERVER or BROUTER, or both, depending on your application's environment. If you need to interface between Btrieve and any other VAP that makes Btrieve calls (for example NetWare SQL), you will need to install the BROUTER program.

At each workstation, you will need enough memory to load the Btrieve requester program (for example, BREQUEST in DOS requires approximately 28KB of memory at each workstation for the default configuration options). The exact amount of memory required depends on the configuration options you specify when you load the program.

NOTE:
NetWare Btrieve does not run under ELS NetWare Level I since it does not support Value-Added Processes.

STARTING BSETUP

You must start BSETUP from a DOS workstation. To start BSETUP, complete the following steps:

1. Start the workstation that will run BSETUP.

2. Copy BSERVER.VAP and BROUTER.VAP into the current directory. This directory must not be the SYS:SYSTEM directory on the server to which you are installing.

3. At the DOS prompt, type `BSETUP` and press Enter.

When BSETUP loads, a menu as shown in Figure 3.1 appears.

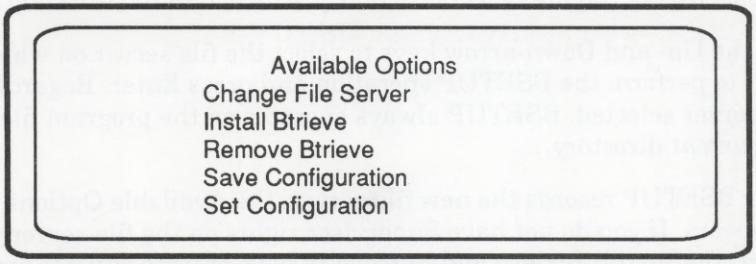

Figure 3.1
BSETUP Menu

USING BSETUP MENU OPTIONS

Use the Up- and Down-arrow keys to select menu options. The menu options are described in the sections that follow. The options are presented in the order you would use them to configure and install Btrieve. If you need help while performing an option, press the F1 (Help) key. To exit a menu option, press Esc.

To exit BSETUP, press Esc at the Available Options menu, and select Yes on the Exit BSETUP menu.

If you are not logged in as Supervisor or do not have Supervisor rights, the Install Btrieve and Remove Btrieve options will not be listed.

NOTE:

Be sure the screen heading indicates the name of the server you wish to install on. If it does not, you can choose a different file server after starting BSETUP using the Change File Server option. See "Change File Server" in this chapter.

CHANGE FILE SERVER

The Change File Server option allows you to choose the file server on which you want to configure, install, remove, or save NetWare Btrieve.

To change file servers, complete the following steps:

1. Select the Change File Server option and press Enter. A menu will appear, listing the file servers currently attached to the workstation.

2. Use the Up- and Down-arrow keys to select the file server on which you want to perform the BSETUP operation and press Enter. Regardless of the server selected, BSETUP always operates on the program files in the *current* directory.

   After BSETUP records the new file server, the Available Options menu reappears. If you do not have Supervisor rights on the file server you select, the Install Btrieve and Remove Btrieve options will not appear.

SET CONFIGURATION

The Set Configuration option allows you to define the Btrieve configuration options for the copy of Btrieve in the current directory. The beginning of this section discusses the procedure for setting configuration options. Following this discussion is a detailed explanation of each option available.

If BSERVER and BROUTER are not present in the current directory when you attempt to set the configuration options, BSETUP returns an error message and terminates execution.

To set any of the configuration options, do the following:

1. Select Set Configuration in the Available Options menu and press Enter. A screen as shown in Figure 3.2 appears.

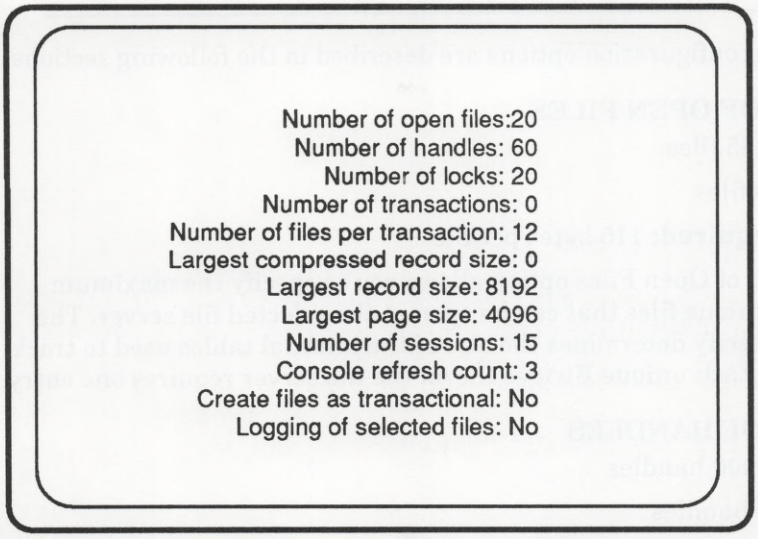
Number of open files:20
Number of handles: 60
Number of locks: 20
Number of transactions: 0
Number of files per transaction: 12
Largest compressed record size: 0
Largest record size: 8192
Largest page size: 4096
Number of sessions: 15
Console refresh count: 3
Create files as transactional: No
Logging of selected files: No

Figure 3.2
Set Configuration Menu

   If you are configuring a new copy of NetWare Btrieve, the default values appear. If you are changing an existing configuration, the last values entered and saved with the Save Configuration option appear for the program files in the *current* directory.

2. Highlight the configuration option you want to change.

3. Type the new value and press Enter. To abandon your change, press Esc.

   If you enter an invalid value for an option, BSETUP will display an error message.

4. Continue to select fields and enter new values for all the options you want to define.

After setting the configuration options appropriate for your environment, press Esc to return to the Available Options menu.

NOTE:
You must execute the Save Configuration option before the new values will be saved to the NetWare Btrieve programs in the current directory.

The Btrieve configuration options are described in the following sections.

NUMBER OF OPEN FILES

Range: 1–255 files

Default: 20 files

Memory required: 115 bytes per file

The Number of Open Files option allows you to specify the maximum number of unique files that can be open at the selected file server. The value you specify determines the size of the internal tables used to track active files. Each unique Btrieve file on the file server requires one entry.

NUMBER OF HANDLES

Range: 1–3000 handles

Default: 60 handles

Memory required: 114 bytes per handle

The Number of Handles option allows you to specify the maximum number of file handles that Btrieve will allow your system to use simultaneously. If two workstations open the same file on the file server, they use two file handles. To calculate the maximum number of handles your system requires, multiply the number of workstations by the maximum number of files each workstation can open.

NUMBER OF LOCKS

Range: 0–5000 locks

Default: 20 locks

Memory required: 8 bytes per lock

The Number of Record Locks option sets the maximum number of records that can be locked simultaneously at the selected file server. Specifically, it determines the number of entries for the lock table that Btrieve builds when it loads. The value for this option includes both single and multiple record locks. To calculate this number, determine the maximum number of open records per workstation and multiply by the number of workstations that access Btrieve files.

NUMBER OF TRANSACTIONS

Range: 0–42 transactions

Default: 0

Memory required: 1046 bytes per transaction

The Number of Transactions option sets the maximum number of stations that may have concurrent active transactions at the file server. If you specify a value of zero, no workstations may issue a Begin Transaction operation to the file server. If you specify a value greater than zero, Btrieve creates a transaction file, BTRIEVE.TRN, in the SYS:SYSTEM directory at the file server and allows that number of active transactions at the file server.

NUMBER OF FILES PER TRANSACTION

Range: 1–18 files

Default: 12 files

Memory required: 85 bytes per file per transaction

The Number of Files Per Transaction option sets the maximum number of files that can be open and accessed within the same transaction. This value is not used if the number of concurrent transactions is zero.

LARGEST COMPRESSED RECORD SIZE

Range: 0–32KB

Default: 0

Memory required: 2 * number of kilobytes specified

The Largest Compressed Record Size option specifies the size (in kilobytes) of the longest record that you will be accessing from a compressed file. Btrieve will allocate twice the number of kilobytes you specify to its compression buffer. Specifying a higher value than you need does not improve performance and may reduce the memory available for other processes at the file server.

If you use compressed files, set this option to the size of the longest record in any of your compressed files. Round any uneven values up to the next kilobyte. For example, if the longest record you will be accessing is 1800 bytes, specify a value of 2 for this option.

If you do not use compressed files, set the value to 0.

LARGEST RECORD SIZE

Range: 600–55,296 bytes

Default: 8192 bytes

Memory required: 2 * specified value + 700 bytes

The Largest Record Size option specifies the length of the longest record that any Btrieve application can access at that file server. Specify the length of the record in bytes. Specifying a higher value than you need does not improve performance.

LARGEST PAGE SIZE

Range: 512–4096 bytes

Default: 4096 bytes

Memory required: n/a

The Largest Page Size option allows Btrieve to calculate the size of the cache buffers it needs. The value specified should be the maximum page size of any Btrieve file you want to access. It must be a multiple of 512 bytes, but no greater than 4096 bytes.

NUMBER OF SESSIONS

Range: 1–100 sessions

Default: 15 sessions

Memory required: 1296 bytes per session

The Number of Sessions option specifies the maximum number of workstation tasks that can access NetWare Btrieve at a time. A session is defined as one copy of the Btrieve requester communicating with NetWare Btrieve. Each session is allocated two packet buffers for Btrieve requests. Specifying a higher value than you need does not improve performance.

CONSOLE REFRESH COUNT

Range: 1–60 seconds

Default: 3 seconds

Memory required: n/a

The Console Refresh Count option controls the time that B STATUS and B ACTIVE delay before refreshing the screen with new information. The delay allows you to maintain the readability of the information while observing the effect of database activity in a real-time mode.

CREATE FILES AS TRANSACTIONAL

Range: Yes/No

Default: No

Memory required: n/a

The Create Files as Transactional option controls whether Btrieve automatically flags files as transactional at the time you create them.

LOGGING OF SELECTED FILES

Range: Yes/No

Default: No

Memory required: n/a

The Logging of Selected Files option controls whether BSERVER logs operations executed on files that are selected for logging. If you specify Yes, Btrieve logs all operations that cause changes on any file listed in \BLOG\BLOG.CFG of its volume. If you specify No, Btrieve does no logging. (For more information on logging, see "BROLLFWD Utility" in Chapter 4, "Utilities.")

SAVE CONFIGURATION

The Save Configuration option allows you to save the Btrieve configuration to the copies of BSERVER.VAP and BROUTER.VAP in the current directory. BSETUP then returns to the Available Options menu. You do not have to be logged in as Supervisor to save a new Btrieve configuration.

To save the new Btrieve configuration, complete the following steps:

1. Select Save Configuration and press Enter.

2. Select Yes in response to the Update Btrieve prompt and press Enter.

If you want the new configuration to take effect on the current file server, execute the Install Btrieve option on the Available Options menu.

INSTALL BTRIEVE

The Install Btrieve option allows you to install Btrieve on the file server selected using the Change File Server option. You must be logged in as Supervisor or have Supervisor rights to install Btrieve on a file server.

NOTE:

When you install Btrieve, the BSETUP program uses the options last set and saved with the Set Configuration and Save Configuration options. If you are installing a new copy of NetWare Btrieve, BSETUP will use default values for these options.

To install Btrieve on a file server, complete the following steps:

1. Select the Install Btrieve option on the Available Options menu and press Enter.

2. If NetWare Btrieve is *already installed* on the current file server, BSETUP asks whether you want to replace the currently installed programs. If you answer Yes to the Replace Btrieve prompt, BSETUP prompts you to enter a password for Btrieve. If you select No and press Enter or Esc, BSETUP returns the Available Options menu to the screen without reinstalling Btrieve.

   If NetWare Btrieve is *not installed* on the current file server, BSETUP will prompt you to enter a password for Btrieve. NetWare Btrieve presents a password when identifying itself to NetWare. Specifying a password increases network security by preventing unauthorized access to NetWare from Btrieve. Once installed, the password automatically protects access through Btrieve without further action by the user. To abandon the installation at this point, press Esc.

3. To continue the installation, type a password up to 40 characters long for Btrieve and press Enter. If you do not want to specify a password but you do want to continue the installation, press Enter at the password prompt. The Install BROUTER prompt will appear.

   BSETUP lets you specify whether you want to install only BSERVER, or BSERVER and BROUTER. BROUTER is necessary only if another VAP, such as NetWare SQL, will be making calls to Btrieve.

4. To install *only* BSERVER, select No at the Install BROUTER prompt and press Enter. BSETUP will do the following:

   - Copy BSERVER to the SYS:SYSTEM directory on the preferred file server.
   - Define BSERVER as an object to NetWare and assign it the password you specified.

To install *both* BSERVER and BROUTER, select Yes at the Install BROUTER prompt and press Enter. BSETUP will do the following:

- Copy BSERVER and BROUTER to the SYS:SYSTEM directory on the selected file server.
- Define the NetWare Btrieve programs as objects to NetWare and assign BSERVER the password you specified. BROUTER does not require a password.

Install BROUTER only if you are using another VAP, such as NetWare SQL, that makes Btrieve calls. To abandon the installation at this point, press Esc to return to the Available Options menu.

5. After you have installed the NetWare Btrieve programs on the file server, you must restart the file server for BSERVER and BROUTER to be loaded.

REMOVE BTRIEVE

The Remove Btrieve option removes the Btrieve programs from the file server selected with the Change File Server option. After you execute this option, the Btrieve VAPs will no longer load at that file server.

NOTE:

If NetWare SQL is defined as an object in the NetWare bindery, BSETUP will not allow you to remove the NetWare Btrieve program files. You must first remove the NetWare SQL program files from the file server before removing the NetWare Btrieve program files. For more information on the order of removing Btrieve program files, refer to the NetWare SQL documentation.

You must be logged in as Supervisor or have Supervisor rights to remove Btrieve from a file server. To remove Btrieve from a file server, do the following:

1. Select the Remove Btrieve option and press Enter.
2. Select Yes in response to the Remove Btrieve prompt and press Enter. After you select this option, BSETUP will do the following:
   - Delete BSERVER (and BROUTER, if it is installed) from the SYS:SYSTEM directory on the selected file server.
   - Remove the Btrieve object name and password from the network.

RUNNING THE REQUESTER PROGRAMS

NetWare Btrieve provides requester programs for DOS, OS/2, and MS-Windows workstations. This section first describes the Btrieve requester start-up options for all three environments and then gives instructions for starting the requester in each specific environment.

START-UP OPTIONS

You can assign values to the Btrieve requester for the /R, /D, /S options in all three environments.

MAPPED DRIVES OPTION (/R)

The /R option denotes the maximum number of mapped drives the workstation can access. When you omit this option, the requester uses a default value of 3. Each drive you specify increases the memory resident size of the requester by 20 bytes. For example, if the workstation has 5 mapped drives, specify the /R option as follows:

```
/R:5
```

DATA MESSAGE LENGTH OPTION (/D)

The /D option specifies the length of the longest record you will be accessing through Btrieve. The requester uses this value to calculate the length of the data message buffer reserved for passing records between BSERVER and your applications. The value you enter here should be the maximum record length you configure for Btrieve through the BSETUP program. (Refer to the section "Set Configuration" earlier in this chapter.)

The default value for the /D option is 2048 bytes. The maximum record length you can specify is from 48 to 54KB, depending on other parameters. Specifying a higher value than you need for the /D option does not improve performance.

The requester maintains one copy of the data message buffer. The /D option increases the memory-resident size of the requester by twice the number of bytes you specify plus 538 bytes.

Specify the record length in bytes. For example, if the longest record your application uses is 3000 bytes long, specify the /D option as follows:

```
/D:3000
```

NUMBER OF FILE SERVERS OPTION (/S)

The /S option denotes the number of file servers that have NetWare Btrieve active on the network. The default value for the /S option is one. The maximum value you can specify is eight. For example, if the workstation has drives mapped to three file servers, specify the /S option as follows:

```
/S:3
```

STARTING THE DOS REQUESTER

BREQUEST, the DOS requester, must be started at the workstation before that workstation can access network Btrieve files using BSERVER.

Start BREQUEST at the workstation by issuing the following command:

```
[path] BREQUEST [/R:number_of_mapped_drives]
                [/D:data_message_length]
                [/S:number_of_file_servers]
```

For example, to specify 4 mapped drives, a 2048-byte data message length, and 2 file servers, use the following command:

```
BREQUEST /R:4 /D:2048 /S:2
```

Replace *path* with the pathname to the directory where BREQUEST is stored. You can omit the pathname if BREQUEST is stored on the default drive or if it is located in a directory in your search path.

To ensure that the configuration options are always loaded, place the BREQUEST command in the workstation's AUTOEXEC.BAT file.

STARTING THE OS/2 REQUESTER

BTRCALLS.DLL, the Btrieve dynamic link requester, must be installed and initialized at an OS/2 workstation before the workstation can access network Btrieve files using BSERVER.

INSTALLING THE OS/2 REQUESTER

To install the Btrieve requester for OS/2, copy BTRCALLS.DLL from the Btrieve diskette to one of the directories specified in the LIBPATH command in the CONFIG.SYS file. (Refer to your OS/2 manual for more information on LIBPATH and on identifying the locations for the dynamic link libraries.) The BTRCALLS.DLL dynamic link library supplied with NetWare Btrieve allows access only to remote files, unless BTRLOCAL.DLL is present. An application at an OS/2 workstation cannot access local files using this routine.

NOTE:

If you have a local version of Btrieve, use the utility MAKLOCAL.EXE to convert your version to BTRLOCAL.DLL before replacing it with the BTRCALLS.DLL requester. To use MAKLOCAL.EXE, at the OS/2 prompt, type `MAKLOCAL` and the directory where BTRCALLS.DLL is stored.

Example:

```
C> MAKLOCAL C:\DLLS
```

INITIALIZING THE OS/2 REQUESTER

You can specify start-up options for each Btrieve application running at the workstation. The requester uses an OS/2 environment variable, BRQPARMS, to define the start-up options for an application. The requester start-up options are described in the section "Start-Up Options" earlier in this chapter.

Set the requester start-up options using the command:

```
SET BRQPARMS=[/R:number_of_mapped_drives]
             [/D:data_message_length]
             [/S:number_of_file_servers]
```

Do not include a space between the BRQPARMS variable name and the equal sign. You can, however, insert a space between each initialization option you specify.

For example, to specify 4 mapped drives, a 2048-byte data message length, and 2 file servers, issue the following command:

```
SET BRQPARMS=/R:4 /D:2048 /S:2
```

USING BREQUEST WITH MS-WINDOWS

In the MS-Windows environment, BREQUEST must be started prior to starting MS-Windows. Windows-based Btrieve applications access the requester by means of a dynamically linked library (DLL) that uses the DOS Protected Mode Interface (DPMI) provided by Windows.

The DLL provides the same Application Programming Interface (API) as the client-based version and requires no modification to the application. It should be noted that the Btrieve DPMI DLL and the client-based Btrieve DLL share the same name: WBTRCALL. Therefore, if applications need to access local files as well as remote files, the client-based Btrieve DLL should be renamed to WBTRLOCL and the local option set. Figure 3.3 shows the communication path between an application, the requester, and the client-based Btrieve DLL.

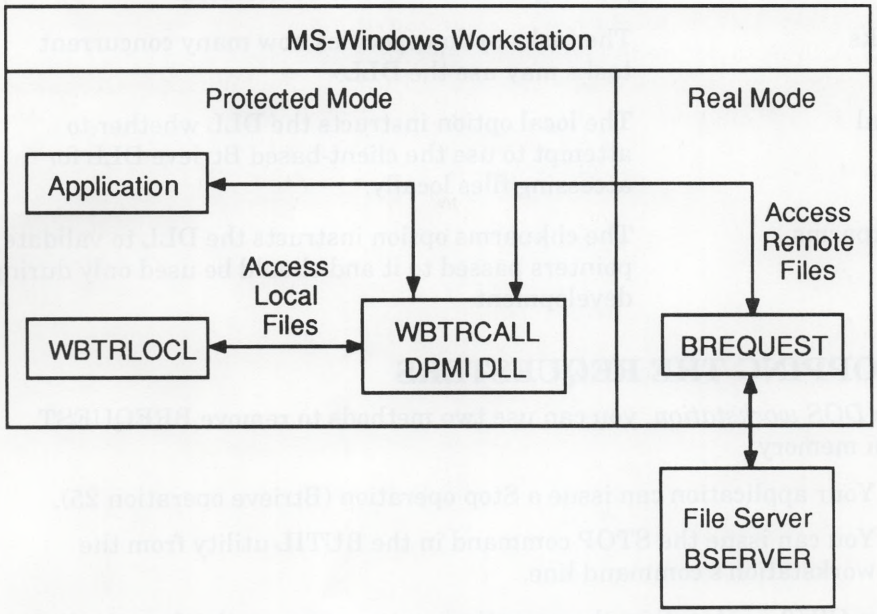

Figure 3.3
MS-Windows Workstation Using BREQUEST

Initialization options for the Btrieve DPMI DLL are placed in WIN.INI. An example follows:

```
[BREQUESTDPMI]
datalength=4096        ; default options
tasks=10
local=no
chkparms=no
```

The following list describes the available initialization options for the Btrieve DPMI DLL.

Option	Description
Datalength	The value for the datalength option should be the same as the value of the /D option when starting BREQUEST.EXE and should be at least as large as the largest record size to be accessed.
Tasks	The tasks option specifies how many concurrent tasks may use the DLL.
Local	The local option instructs the DLL whether to attempt to use the client-based Btrieve DLL for accessing files locally.
Chkparms	The chkparms option instructs the DLL to validate pointers passed to it and should be used only during development.

STOPPING THE REQUESTERS

At a DOS workstation, you can use two methods to remove BREQUEST from memory:

- Your application can issue a Stop operation (Btrieve operation 25).
- You can issue the STOP command in the BUTIL utility from the workstation's command line.

At an OS/2 workstation, the operating system removes the dynamic link routines from memory when the last Btrieve application is terminated.

At a Windows workstation, due to its status as a dynamically linked library, the Btrieve DPMI DLL is automatically removed from memory when the application using it is terminated. Applications must call WBTRVSTOP ( ) before terminating. This is normally done during the processing of the WM_CLOSE message. This is necessary to terminate the SPX session with the server and remove the task from the DLL's task list. A nonzero status code is returned from WBTRVSTOP ( ) if any files have been left open or a transaction is active. The application should allow the user to close all files, end the transaction, or perform a Btrieve Reset operation before again calling WBTRVSTOP ( ).

STOPPING BTRIEVE

Once BSERVER and BROUTER are activated, they reside in the file server's memory while the NetWare operating system is running. To terminate BSERVER alone, use the B DOWN console command. To terminate all VAPs, including both BSERVER and BROUTER, use the NetWare DOWN command.

When you issue either a B DOWN or a DOWN command, BSERVER resets all active network connections that are accessing files on the file server.

4 UTILITIES

This chapter presents the following sections:

- Console Commands
- BCONSOLE Utility
- BROLLFWD Utility

The console commands and the BCONSOLE utility both allow system monitoring, but the console commands also allow control of the operations on its particular file server. BCONSOLE monitors in a read-only mode but allows you to move from one file server to another. The BROLLFWD utility is used primarily to recover from a system failure.

CONSOLE COMMANDS

Btrieve console commands allow you to determine the file activity and current utilization of BSERVER for a particular server. You must execute the commands at the console on a file server at which BSERVER is loaded. Only data pertaining to this one server is displayed or affected.

This section describes the NetWare Btrieve console commands. Each description includes:

- A brief description
- Format — the form in which the console command should be entered at the file server where BSERVER is located
- Procedure — steps you take to execute the command
- Remarks — detailed explanation of how the command works

B ACTIVE

The B ACTIVE console command displays a table containing the full pathname of the file, the network connection number that has the file open, and the type of locks for the file.

Format

```
B ACTIVE screen
```

Procedure

1. Enter the command at the server where BSERVER.VAP is loaded (command can be entered in upper- or lowercase letters).
2. When there are more active files to display, B ACTIVE displays a message at the bottom of the screen. To see additional screens, re-enter the B ACTIVE command, substituting the number for the screen you want to view for *screen*. For example, to view the second screen of a B ACTIVE operation, type the following and press Enter:

   ```
   B ACTIVE 2
   ```

B ACTIVE will continue refreshing the screen until you issue the B OFF command, described later in this chapter. If you do not issue B OFF, B ACTIVE will continue to refresh the screen, even after you issue another command.

Remarks

You can use the connection number returned by B ACTIVE to determine which user has the file open. You also can use this number as a parameter in a B RESET command, a RESET command in the BUTIL utility, or a Btrieve Reset operation to close the files and release the resources of a particular workstation.

If another VAP has the file open, B ACTIVE displays a two-character code for the connection number. For example, the code for NetWare SQL is NS. You cannot use this code as input for a B RESET command. B RESET is described later in this chapter.

These are the codes for the three-lock types:

Lock	Code
Transaction	T
Single record	A
Multiple record	M

B DOWN

The B DOWN console command releases all resources used by BSERVER and terminates execution of the BSERVER VAP at this server.

Format

```
B DOWN
```

Procedure

Enter the command at the server where BSERVER.VAP is loaded (command can be entered in upper- or lowercase letters).

Remarks

When you issue B DOWN, Btrieve closes all Btrieve files open at the file server, releases all of the locks Btrieve holds at the file server, aborts any pending transactions at the file server, and halts the BSERVER VAP.

If you are running another VAP that uses BSERVER to access network files, you should take the following precautions before you issue the B DOWN command:

- Issue the B ACTIVE command to confirm that no files are open by another VAP.
- If any other VAP has Btrieve files open at the file server, you should issue the appropriate command for that VAP to close its files and halt the process.

For example, if you were running NetWare SQL, you would issue the NS RESET and NS DOWN commands to make sure that all NetWare SQL files were closed. After you issue the B DOWN command, workstations and other VAPs will not be able to access Btrieve files through BSERVER until the file server is restarted.

The B OFF console command stops the previous Btrieve command line utility from refreshing the screen.

B OFF

Format

```
B OFF
```

Procedure

Enter the command at the server where BSERVER.VAP is loaded (command can be entered in upper- or lowercase letters).

Remarks

You should issue B OFF after B ACTIVE, B STATUS, or B USAGE has displayed the information you need. If you do not issue B OFF, these commands will continue to refresh the screen, even after you issue another command.

B RESET

The B RESET console command releases all resources used by a workstation, or if you specify an asterisk (*), resets all workstations on the network.

Format

```
B RESET < connection_number | * >
```

Procedure

Enter the command at the server where BSERVER.VAP is loaded (command can be entered in upper- or lowercase letters), followed by the connection number of the workstation that you want to reset. For example, to release all resources for workstation 12, you would enter the following command at the server console:

```
B RESET 12
```

To reset all workstations, enter the following command at the server console:

```
B RESET *
```

The B RESET operation will not accept the two-character ASCII connection ID, which signifies a VAP, as input. To reset any files open by a VAP, you must use the appropriate reset command for that VAP.

Remarks

When you issue the B RESET command followed by a workstation's connection number, Btrieve does the following:

- Closes all open Btrieve files at the workstation
- Releases all locks held by the workstation
- Aborts any transaction pending at the workstation

B STATUS

You can use B STATUS to determine the most efficient level of resources allocated to BSERVER for your environment.

Format

```
B STATUS
```

Procedure

Enter the command at the server where BSERVER is loaded (command can be entered in upper- or lowercase letters). The status menu appears as shown in Figure 4.1.

"Current" values are those accumulated since the B STATUS command was issued. "Total" values are those accumulated since BSERVER was loaded. "Max" values are the maximum available in the network's current configuration. "Peak" values reflect the highest utilization of the resource since BSERVER was loaded. The following information is returned by the B STATUS command.

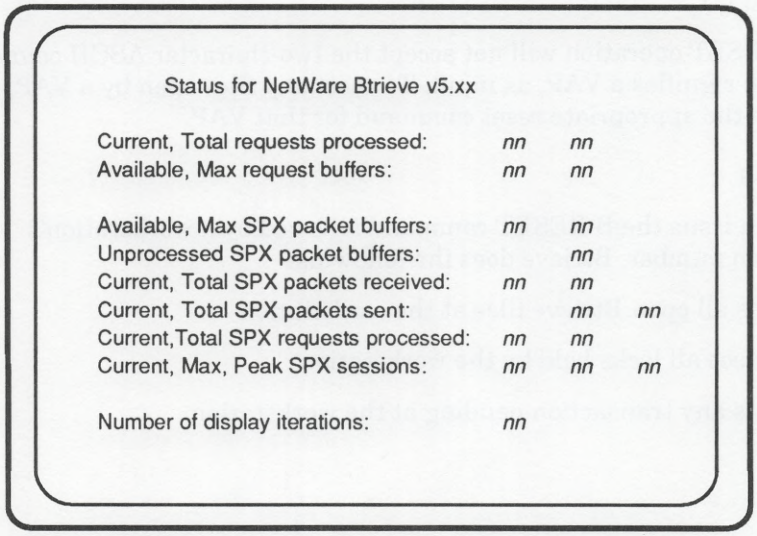
Status for NetWare Btrieve v5.xx
Current, Total requests processed: nn nn
Available, Max request buffers: nn nn
Available, Max SPX packet buffers: nn nn
Unprocessed SPX packet buffers: nn
Current, Total SPX packets received: nn nn
Current, Total SPX packets sent: nn nn
Current,Total SPX requests processed: nn nn
Current, Max, Peak SPX sessions: nn nn nn
Number of display iterations: nn

Figure 4.1
B STATUS Menu

B STATUS

(continued)

"Current, Total requests processed" are the network requests processed by BSERVER from both workstations and other VAPs, such as NetWare SQL.

"Available, Max request buffers" are the processes active for the VAP. For BSERVER, this value is always 1.

"Available, Max SPX packet buffers" are the NetWare packet buffers now available to BSERVER, and the maximum available to BSERVER.

"Unprocessed SPX packet buffers" is the difference between the maximum number of NetWare packet buffers available to BSERVER and the number available to BSERVER.

"Current, Total SPX packets received" are the network packets received by BSERVER from workstations.

"Current, Total SPX packets sent" are the network packets sent to workstations by BSERVER.

"Current, Total SPX requests processed" are the network requests processed by BSERVER.

"Current, Max, Peak SPX sessions" are the BSERVER sessions in use, and the maximum number available to BSERVER.

"Number of display iterations" is the number of times the B STATUS screen has been refreshed since the B STATUS command was issued.

You should issue B OFF after B STATUS has displayed the information you need. If you do not issue B OFF, B STATUS will continue to refresh the screen, even after you issue another command.

Remarks

B STATUS returns information about network requests, packet buffers, the sessions in use for the file server where you issue the command, and the number of times the console screen has been refreshed since the command was issued.

B USAGE

The B USAGE console command shows the Btrieve configuration information including open files, file handles, locks, and transactions.

Format

```
B USAGE
```

Procedure

Enter the command at the server where BSERVER.VAP is loaded (command can be entered in upper- or lowercase letters). The B USAGE menu appears as shown in Figure 4.2.

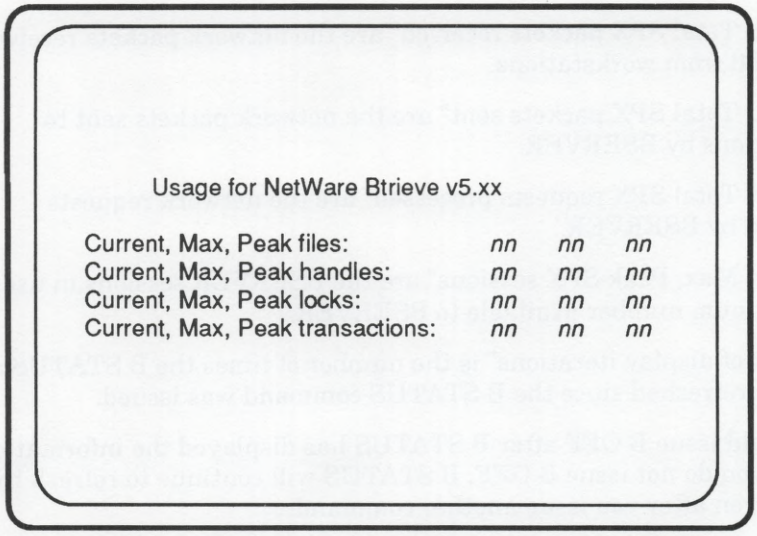
Usage for NetWare Btrieve v5.xx
Current, Max, Peak files: nn nn nn
Current, Max, Peak handles: nn nn nn
Current, Max, Peak locks: nn nn nn
Current, Max, Peak transactions: nn nn nn

Figure 4.2
B USAGE Menu

"Current" values are those currently in use. "Max" values are the maximum available in the current BSERVER configuration. "Peak" values show the highest usage of the resource since BSERVER was loaded.

You should issue B OFF after B USAGE has displayed the information you need. If you do not issue B OFF, B USAGE will continue to refresh the screen, even after you issue another command.

BCONSOLE UTILITY

Btrieve provides a menu-driven utility called BCONSOLE that lets you monitor the activity of any Btrieve VAP on the network from your workstation. BCONSOLE monitors file server activity one server at a time, in read-only mode. You must have Supervisor rights and be attached to the server where NetWare Btrieve is running to use BCONSOLE.

The following sections describe options on the BCONSOLE utility menu.

ACTIVE FILES

The Active Files option lists all files currently being accessed through NetWare Btrieve on the selected server.

In a busy network environment, file activity and resource use can change quickly. The information on the Active File menu is not continuously updated; therefore, the data displayed on the screen may be inaccurate. To see the current file activity, return to the BCONSOLE main menu and select the Active Files option again.

To display handle information about a particular file, select its filename on the Active Files menu and press Enter. The Connection ID, Locks, and Transactions for that particular file are listed on the screen.

CHANGE CURRENT FILE SERVER

When you select the Change Current File Server option, a list of the current file servers appears. Only file servers that have NetWare Btrieve loaded and to which you are attached with Supervisor rights are listed. To change to a new server, select the desired server and press Enter. The new server name appears on the BCONSOLE main menu.

After you select a new file server, all subsequent BCONSOLE operations apply to the new server. Your chosen default server is not affected by this selection.

RESOURCE USAGE

The Resource Usage option provides a static display that lists the files, handles, locks, and transactions in use. You can use this list to determine if BSERVER is most efficiently configured for your environment.

The current, peak, and maximum values are listed in columns one through three for each resource. The first column, "Current," lists the number of resources presently in use. The second column, "Peak," lists the highest resource use since BSERVER was loaded. The third column, "Max," lists the maximum available resources in the current BSERVER configuration.

Figure 4.3 shows the format of the Resource Usage menu.

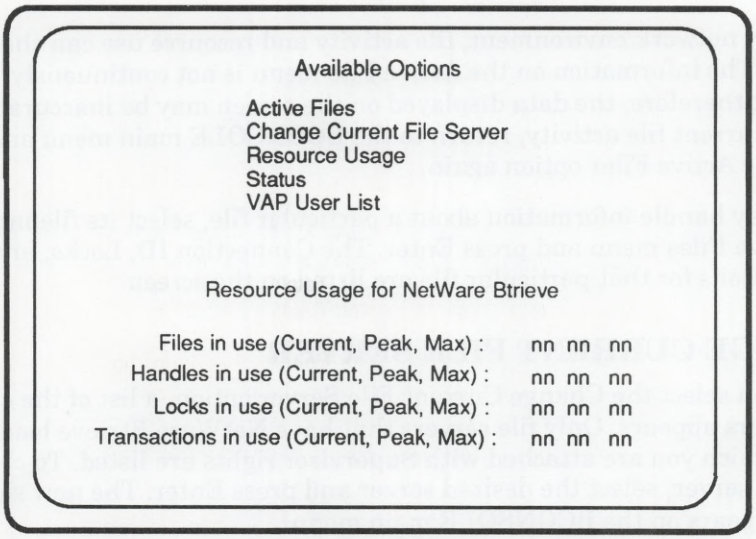
Available Options
Active Files
Change Current File Server
Resource Usage
Status
VAP User List
Resource Usage for NetWare Btrieve
Files in use (Current, Peak, Max) : nn nn nn
Handles in use (Current, Peak, Max) : nn nn nn
Locks in use (Current, Peak, Max) : nn nn nn
Transactions in use (Current, Peak, Max) : nn nn nn

Figure 4.3
BCONSOLE Resource Usage Screen

STATUS

The Status option provides a display that counts network requests, packet buffers, and the sessions in use for the current server. This screen is continually updated until you return to the main menu by pressing Esc.

Several types of information are presented on the Status screen: current, total, available, maximum, and peak. Unlike the Resource Usage screen, the type of information in each column changes for each line. The format of the Status screen is shown in Figure 4.4.

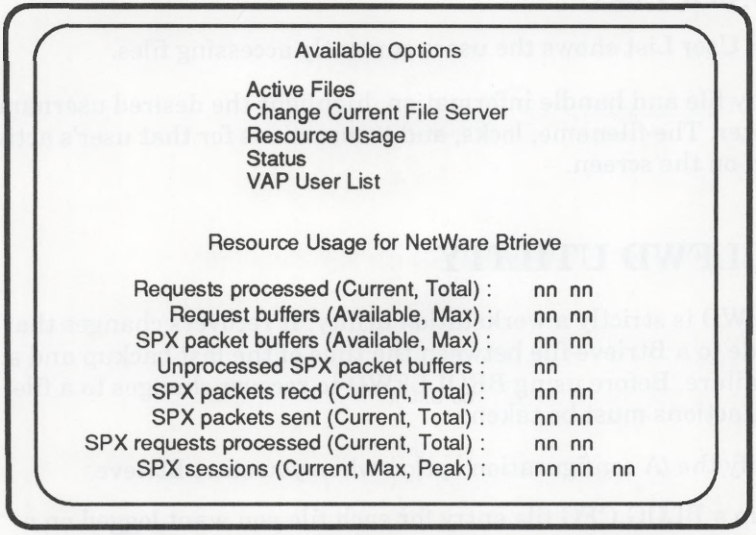
Available Options
Active Files
Change Current File Server
Resource Usage
Status
VAP User List
Resource Usage for NetWare Btrieve
Requests processed (Current, Total) : nn nn
Request buffers (Available, Max) : nn nn
SPX packet buffers (Available, Max) : nn nn
Unprocessed SPX packet buffers : nn
SPX packets recd (Current, Total) : nn nn
SPX packets sent (Current, Total) : nn nn
SPX requests processed (Current, Total) : nn nn
SPX sessions (Current, Max, Peak) : nn nn nn

Figure 4.4
BCONSOLE Status Screen

"Requests processed" is the number of network requests processed by BSERVER from both workstations and other server-based applications, such as NetWare SQL.

"Request buffers" is the number of processes active for the VAP. For BSERVER, this value should always be 1.

"SPX packet buffers" is the number of NetWare communication buffers available to BSERVER and the maximum number available at the server.

"Unprocessed SPX packet buffers" is the maximum number of NetWare communication buffers received but not yet processed by BSERVER.

"SPX packets received" is the number of network communication packets received by BSERVER from workstations.

"SPX packets sent" is the number of network communication packets sent to workstations by BSERVER.

"SPX requests processed" is the number of network requests processed by BSERVER.

"SPX sessions" is the current number of BSERVER sessions in use, the maximum number available to BSERVER, and the peak use.

VAP USER LIST

The VAP User List shows the users currently accessing files.

To display file and handle information, highlight the desired username and press Enter. The filename, locks, and transactions for that user's active files are listed on the screen.

BROLLFWD UTILITY

BROLLFWD is strictly a workstation utility. It recovers changes that have been made to a Btrieve file between the time of the last backup and a system failure. Before using BROLLFWD to recover changes to a file, the following actions must be taken:

- Specify the /A configuration option when you start Btrieve.
- Set up a BLOG.CFG file entry for each file you want logged on a particular volume.
- Make a backup copy of your file before the logging begins.

When you specify logging for a file, Btrieve records every operation that changes the file. In the event of a system failure, you can run BROLLFWD on the backup copy of your file to reapply all changes that have been made since the backup.

SPECIFYING LOGGING

To specify logging for a particular file, you must first select the logging operation during configuration by selecting the /A configuration option when starting BROLLFWD. Next, you specify a particular file you want logged and assign it an associated log file. This log file can reside on the same volume where the Btrieve file is located or on any other volume of the same server.

To specify which Btrieve files should be affected by logging, you must create a directory named BLOG at the root level on each drive for local files, and on each volume for servers with at least one Btrieve file to be logged. In this directory, you should create a text file named "BLOG.CFG" that contains an entry for each Btrieve file that will be logged on this drive or volume. Each entry must fit completely on one line. Multiple entries can be put on the same line, separated by one or more spaces. Each line can contain a maximum of 256 characters.

The entries for local files should be in the following format:

```
Btrieve_filename=log_name
```

Btrieve_filename is the absolute pathname of a Btrieve file without the drive letter, and *log_name* is the absolute pathname of the associated log file without the drive letter.

The entries for server files should be in the following format:

```
\directory\Btrieve_filename=

[\\server_name\volume:]\directory\log_name
```

The following list describes the syntax parameters that specify the BLOG.CFG entries.

Parameter	Description
directory	One or more consecutive subdirectory names in the path to the Btrieve file or the log file.
Btrieve_filename	The name of the Btrieve file to be logged.
server_name	The name of the server where the log file is located.
volume	The name of the volume where the log file is located.
log_name	The name of the associated log file. If the log file and the specified Btrieve file are on the same volume, specify the name of the log file without specifying the server and volume name. If the log file and the specified Btrieve file are on different volumes, specify the *server_ name*, *volume*, and *log_name*. When the server and volume names are specified, there must be a double backslash (\\) before the server name for the name to be parsed correctly. Otherwise, the server name specified becomes part of the path of the current server. Since the resulting path is incorrect, the log file is not stored.

If you do not provide a log name, Btrieve (at the time the file is first opened) will assign the original filename to the log file and give it a .LOG extension. For example, if you did not specify a log name for the Btrieve file CUSTOMS.DAT in the directory DEALS, Btrieve would assign the full name \DEALS\CUSTOMS.LOG to the associated log file. In this case, the default log file will share the same directory as the Btrieve file.

As each operation that modifies the file is executed, Btrieve records the operations in the log file. Each subsequent operation will be appended to the end of this log file until the log file is deleted. For this reason, the system administrator should perform periodic housekeeping to reduce the size of the log files.

IMPORTANT:

The system administrator must periodically make a backup of the Btrieve files and *at the same time* delete the associated log files *before* executing any further operations that could change the files.

RUNNING BROLLFWD

BROLLFWD calls Btrieve to perform operations recorded in a log file. It can also recover operations from multiple files in one run.

Before running BROLLFWD, you should restore the Btrieve file from the backup copy. After applying BROLLFWD to a file, you should back up the file and delete the corresponding log file before continuing with Btrieve operations to be logged.

The format for the BROLLFWD command is as follows:

```
BROLLFWD < Btrieve_filename | @file_list | /A > [/L] [/O:owner_name]
```

The following table describes the parameters of the BROLLFWD command.

Option	Description
Btrieve_filename	This is the name of the Btrieve file to be recovered. If you select this option, the associated log filename is taken by BROLLFWD from the BLOG.CFG file.
@file_list	This option is used to recover multiple files. Use the name of a text file for *file_list* that lists a series of Btrieve filenames separated by one or more spaces.

Option	Description
/A	Specify this option if you want to automatically recover all the files on a volume. The names of the files are taken from /BLOG/BLOG.CFG. Before using this option, change the current drive to one that maps to the volume in question.
/L	The optional /L parameter indicates that the logged operations should not be executed. Instead, these operations are simply listed to the standard output device.
/O	The optional /O parameter specifies an owner name. You must provide this parameter if the backup copy of the file from which BROLLFWD starts has a Btrieve owner. This protects the owned files from being changed inadvertently. Typically, all owned files in an application will have the same owner name. Therefore, the owner name specified by the /O parameter is assumed as the default value for each file that is listed in the file list. You may be using a group of files designated by a file list, in which there are files with more than one owner. If you specify the /O parameter, Btrieve tries to open each owned file using the specified owner name. When it encounters a file with a different owner name, the system will prompt you to supply the owner name for that file. If the /O parameter is not specified and an owner name is required, the system will also prompt you for the owner name.
owner_name	This is the owner name of the files to be accessed by your application. When you use the /O parameter, an owner name must be specified. For more information, see the discussion of the /O parameter in this section.

APPENDIX: STATUS CODES AND MESSAGES

The following sections explain the error messages and status codes returned by NetWare Btrieve and error messages returned by the Btrieve requesters.

BTRIEVE STATUS CODES

NetWare Btrieve returns a status code after each operation an application performs. If the operation is successful, Btrieve returns status code 0. If the operation is not successful, Btrieve returns one of the nonzero codes described in this section.

01 INVALID OPERATION

The operation parameter specified in the call is invalid.

02 I/O ERROR

An error occurred during a disk read/write. This status code indicates that the file has been damaged and must be recreated, or that the file specified on the open call was not created. This status code also occurs if the application passed an invalid position block.

03 FILE NOT OPEN

The operation cannot execute because the file is not open. A successful Open operation must be performed before Btrieve can process any other operations. This status code also occurs if the application passed an invalid position block for the file.

04 KEY VALUE NOT FOUND

The specified key value in the index path was not found.

05 DUPLICATE KEY VALUE

A record with a key field containing a duplicate key value cannot be added to an index that does not allow duplicate values.

06 INVALID KEY NUMBER

The value stored in the key number parameter is not valid for the file being accessed. The key number must correspond to one of the keys defined when the file was created or to a supplemental index.

07 DIFFERENT KEY NUMBER

The key number parameter changed before a Get Next, Get Next Extended, Get Previous, Get Previous Extended, Update, or Delete operation. The operation specified requires the same key number parameter as the previous operation because Btrieve uses positioning information relative to the previous key number.

If you need to change key numbers between consecutive Get Next, Get Next Extended, Get Previous, or Get Previous Extended operations, use a Get Position operation followed by a Get Direct operation to reestablish positioning for the new index path.

08 INVALID POSITIONING

The current position must be established to update or delete a record. Perform a Get or Step operation to establish the current position. This status code may also occur if the application passed an invalid position block for the file.

09 END-OF-FILE

The operation tried to read past the file boundaries (end-of-file or start-of-file). When reading a file in ascending order according to an index path, Btrieve returns the last record in that index path. When reading a file in descending order according to an index path, Btrieve returns the first record in the index path.

The Get Extended and Step Extended operations return this status code if the number of records satisfying the filtering condition is less than the number of specified records to be returned and the reject count has not been reached.

10 MODIFIABLE KEY VALUE ERROR

The operation tried to modify a key field that is defined as nonmodifiable.

11 INVALID FILENAME

The filename specified does not conform to filenaming conventions.

12 FILE NOT FOUND

The filename specified does not exist. Check the key buffer parameter to make sure the pathname is terminated with a blank or a binary zero.

13 EXTENDED FILE ERROR

Btrieve could not find the extension file for an extended file that the application tried to open. Extension files must be loaded on the logical disk drive specified when the extension was created. Both the primary file and its extension file must be online to access an extended file.

14 PRE-IMAGE OPEN ERROR

The pre-image file could not be created or opened. There are three possible causes for this error.

- Btrieve could not create a new pre-image file because your disk directory is full. Btrieve must be able to create a pre-image file.
- Btrieve could not open the pre-image file to restore file integrity. If the pre-image file was erased or damaged, Btrieve could not restore the file's integrity. In this case, either use the RECOVER command in the BUTIL utility to retrieve the damaged file's data records in a sequential file or replace the file with its most recent backup.
- Btrieve could not assign a handle to the pre-image file because Btrieve was not started by a user with access rights to the pre-image file.

15 PRE-IMAGE I/O ERROR

An I/O error occurred during the pre-imaging function. Either the disk is full or the pre-image file is damaged.

- If the disk is full, erase any unnecessary files or extend the file to gain additional disk space.
- If the pre-image file is damaged, the integrity of the Btrieve file cannot be ensured. Either use the RECOVER command in the BUTIL utility to retrieve the damaged file's data records in a sequential file or replace the file with its most recent backup.

16 EXPANSION ERROR

An error occurred while writing the directory structure to disk prior to the creation of the expanded file partition. Either Btrieve could not close the file or a new page was added to the file and Btrieve could not close and reopen the file to update the directory structure. Check for a disk hardware failure.

17 CLOSE ERROR

An error occurred while writing the directory structure to disk prior to closing the file. Either Btrieve could not close the file or a new page was added to the file and Btrieve could not close and reopen the file to update the directory structure. Check for a disk hardware failure. This status code may also occur if the application passed an invalid position block for the file.

18 DISK FULL

The disk is full, and the file could not be expanded to accommodate the insertion. Either erase any unnecessary files or extend the file to gain additional disk space.

19 UNRECOVERABLE ERROR

An unrecoverable error has occurred. File integrity cannot be ensured. Either use the RECOVER command in the BUTIL utility to retrieve the damaged file's data records in a sequential file or replace the Btrieve file with its most recent backup.

20 RECORD MANAGER INACTIVE

The operation was not processed because the requester or the NetWare Btrieve Record Manager was not loaded. Load the requester or the Btrieve Record Manager.

21 KEY BUFFER TOO SHORT

The key buffer parameter was not long enough to accommodate the key field for the index path requested. Verify that the length of the key buffer equals the defined length of the key specified in the key number parameter. This status code can be returned only by certain interfaces.

22 DATA BUFFER LENGTH

The data buffer parameter was not long enough to accommodate the length of the data record defined when the file was created. Verify that the length of the data buffer is as least as long as the file's defined record length.

- For Get or Step operations, if the data buffer is too short to contain the fixed length portion of the record, Btrieve does not return any data to the data buffer. If the record is a variable length record and the data buffer is too short to contain the entire variable length portion of the record, Btrieve returns as much data as it can and a status code 22, indicating that it could not return the entire record.
- For the Insert operation, Btrieve does not insert the record if the data buffer is shorter than the fixed length portion of the record.
- For the Update operation, if the data buffer is too short to contain the fixed length portion of any record, Btrieve does not update the record.
- For the Create, Stat, and Create Supplemental Index operations, a status code 22 indicates that the data buffer is not long enough to contain all the file and key specifications and the alternate collating sequence definition, if specified.

23 POSITION BLOCK LENGTH

The position block parameter is not 128 bytes long. This error can be detected only using certain language interfaces.

24 PAGE SIZE ERROR

Two possible reasons for this status code exist.

- The page size is invalid. The page size must be a multiple of 512 bytes but must be no larger than 4096 bytes.
- When you set the Btrieve page size configuration, the specified value must be greater than or equal to the page size of the file you plan to create or access. The value of the configuration option may need to be increased.

25 CREATE I/O ERROR

The file specified cannot be created. Possible causes are a full disk directory or a full disk. If you are creating a file over an existing file, Btrieve returns this status if the existing file is open or flagged transactional.

26 NUMBER OF KEYS

The number of keys specified for the page size is invalid. For standard Btrieve files with a page size of 512 bytes, the number of key segments must be between 1 and 8. For larger page sizes, the number of key segments must be between 1 and 24. You must define at least one key without the null attribute.

27 INVALID KEY POSITION

The key field position specified exceeds the defined record length for the file. Either the key position is greater than the record length or the key position plus the key length exceeds the record length. For key-only files, the key must begin in the first byte of the record (position 1).

28 INVALID RECORD LENGTH

The record length is invalid. The record length specified (plus overhead for duplicates) must be less than or equal to the page size minus six, or greater than or equal to 4 bytes.

29 INVALID KEY LENGTH

The key length is invalid. The key length specified must be greater than 0 and cannot exceed 255. The length of a binary key must be even. Btrieve requires that each key page in the file must be large enough to hold at least eight keys.

If the page size is too small to accommodate eight occurrences of the specified key length (plus overhead), either increase the file's page size or decrease the key length.

30 NOT A BTRIEVE FILE

The filename specified is not a valid Btrieve file. Either the file was not created by Btrieve or it was created by an earlier version of Btrieve.

Another possibility is that the first page of the file, which contains the File Control Record, is damaged.

31 FILE ALREADY EXTENDED

The file specified has already been extended. A file can be extended only once.

32 EXTEND I/O ERROR

The file cannot be extended. Possible causes are that the directory or the disk is full.

34 INVALID EXTENSION NAME

The filename specified for the extended partition is invalid.

35 DIRECTORY ERROR

An error occurred while changing to the directory that contains the Btrieve file. Either the drive specified in the Get Directory operation does not exist or the pathname specified in a Set Directory operation was invalid.

36 TRANSACTION ERROR

A Begin Transaction operation can not be performed because no transactions were specified when NetWare Btrieve was configured.

37 TRANSACTION IS ACTIVE

A Begin Transaction was issued while another transaction was active at that station. Transactions cannot be nested.

38 TRANSACTION CONTROL FILE I/O ERROR

An error occurred when Btrieve tried to write to the transaction control file. Possible causes are that the disk is full, the disk is write-protected, or the transaction control file (which was created when NetWare Btrieve was loaded) is deleted.

39 END/ABORT TRANSACTION ERROR

An End or Abort Transaction operation was issued without a corresponding Begin Transaction operation.

40 TRANSACTION MAX FILES

The application tried to update more than the maximum number of files allowed within a transaction. The maximum number of different files that can be updated during a logical transaction is set when NetWare Btrieve is configured.

41 OPERATION NOT ALLOWED

The application tried to perform an operation that is not allowed at this time. Some operations are not allowed under certain operating conditions. For example, Btrieve returns this status code if you attempt to perform a Step, Update, or Delete operation on a key-only file or a Get operation on a data-only file.

Also, certain operations are prohibited during transactions because they have too great an effect on the pre-image file or on Btrieve's performance. These operations include Close, Set or Clear Owner, Extend, Create Supplemental Index, and Drop Supplemental Index.

42 INCOMPLETE ACCELERATED ACCESS

The application tried to open a file that was previously accessed in an accelerated mode and was never successfully closed. The file's integrity cannot be ensured. Either use the RECOVER command in the BUTIL utility to build a new file or restore the file using the latest backup.

43 INVALID RECORD ADDRESS

The record address specified for a Get Direct operation is invalid. The address is outside of the file's boundaries; it is not on a record boundary within a data page, or on a data page. The 4-byte address you specify for a Get Direct operation should be one that was obtained by a Get Position operation.

44 NULL KEY PATH

The application tried to use the Get Direct operation to establish an index path for a key whose value is null in the corresponding record. Btrieve cannot establish positioning based on a null key value.

45 INCONSISTENT KEY FLAGS

The key flags specification on a Create operation is inconsistent. If a key has multiple segments, the duplicate, modifiable, and null attributes should be the same for each segment in the key.

46 ACCESS TO FILE DENIED

The application opened a file in the read-only mode and tried to perform an Update, Delete, or Insert on that file. Another possible cause is that the owner name required for updates was not specified correctly when you opened the file.

47 MAXIMUM OPEN FILES

The number of files opened in accelerated mode exceeded the number of buffers available in Btrieve's cache. When a file is opened in accelerated mode, Btrieve reserves one of its cache buffers for the file. Btrieve always reserves five empty buffers for index manipulation. Reconfigure NetWare Btrieve with a smaller page size to allocate more buffers.

48 INVALID ALTERNATE SEQUENCE DEFINITION

The first byte of an alternate collating sequence definition (the identification byte) did not contain the hexadecimal value AC.

49 KEY TYPE ERROR

The application tried to create a file or a supplemental index with an invalid extended key type or tried to assign an alternate collating sequence to a binary key or key segment. You can assign an alternate collating sequence to string, lstring, or zstring key types only.

This status code is also returned if you define a supplemental index requiring an alternate collating sequence, and no alternate collating sequence definition exists either in the file or in the key definition passed in the data buffer.

50 OWNER ALREADY SET

The application tried to perform a Set Owner operation on a file that already has an owner. Use the Clear Owner operation to remove the previous owner before specifying a new one.

51 INVALID OWNER

There are two possible causes for this status code.

- If the Btrieve application received this status code after a Set Owner operation, the owner names specified in the key buffer and data buffer did not match.
- If the Btrieve application received this status code after an Open operation, the file you tried to open has an owner name assigned to it. Your application must specify the correct owner name in the data buffer.

52 ERROR WRITING CACHE

While trying to make a cache buffer available, Btrieve tried to write data to a logical disk drive from a file that was previously opened in accelerated mode. An I/O error occurred during a write.

53 INVALID INTERFACE

An application tried to access a file containing variable length records with a language interface from Btrieve v3.15 or earlier. To access files with variable length records, you must use a Btrieve v4.xx or later interface.

54 VARIABLE PAGE ERROR

During a Step Direct operation, Btrieve could not read all or part of the variable length portion of a record. In this case, Btrieve returns as much data as possible to your application. This error usually indicates file damage to one or more pages in the file.

55 AUTOINCREMENT ERROR

The application tried to specify either the segmented or duplicate attribute for an autoincrement key type. An autoincrement key cannot be part of another key and cannot allow duplicates.

56 INCOMPLETE INDEX

A supplemental index is damaged. This can occur if a Create Supplemental Index operation or a Drop Supplemental Index operation is interrupted and does not run to completion. Perform a Drop Supplemental Index operation to completely remove the index from the file.

58 COMPRESSION BUFFER TOO SHORT

The application tried to read or write a record that is longer than the value specified for the size of the compression buffer. Reconfigure NetWare Btrieve, specifying a higher value for the Maximum Compressed Record Size configuration option.

59 FILE ALREADY EXISTS

This status code is returned for the Create operation if you specified –1 in the key number parameter and the name of an existing file in the key buffer parameter.

60 REJECT COUNT REACHED

Btrieve rejects the number of records specified by the reject count before an Extended Get/Step operation can find the requested number of records that satisfied the filter condition. Check the first 2 bytes of the data buffer returned for the number of records that were retrieved.

61 WORK SPACE TOO SMALL

The Extended Get/Step operations use the pre-image buffer as work space. This work space buffer is not large enough to hold the filtering data buffer structure and the largest record to be received. The size of the work space is specified by the Pre-image Buffer Size configuration option. Check the first 2 bytes of the data buffer returned for the number of records that were retrieved.

62 INCORRECT DESCRIPTOR

The descriptor (that is, data buffer structure), which is passed for an Extended Get or Step operation, is incorrect. The descriptor is the data buffer structure that is passed for a Get/Step Next/Previous operation.

63 INVALID EXTENDED INSERT BUFFER

An Extended Insert provides an invalid buffer. Either the buffer length is less than 5 bytes or the number of records specified is 0.

64 FILTER LIMIT REACHED

During an Extended Get Next/Previous operation, a rejected record was reached. Furthermore, this rejected record is such that no other record can satisfy the given filtering condition, going in the direction specified by the operation. This is applicable only if the key specified by the key number is also used as the filtering field.

65 INCORRECT FIELD OFFSET

The field offset in the extractor of an Extended Get/Step is invalid based on the length of the retrieved record.

74 AUTOMATIC TRANSACTION ABORT

This is an informative status code and is applicable only in the server-based environment. Btrieve replaced an End Transaction operation with an Abort Transaction because an error had been detected for a TTS file inside a transaction. In addition, Btrieve executed the Abort Transaction operation.

78 DEADLOCK DETECTED

Btrieve detected a deadlock condition. The application should clear all resources (such as aborting or ending the transaction or releasing all record locks) before proceeding. This allows the other applications to access the resources for which they are waiting.

79 PROGRAMMING ERROR

This is an internal programming error. Contact the Novell Development Products Division.

80 CONFLICT

The Update or Delete operation was not performed. When using Btrieve with DOS, MS-Windows, or OS/2, this status code is returned when another application changes a record on the data page from which you originally read the record that you wanted to update or delete. In NetWare Btrieve, this status code is returned when the record that you originally read has been changed by another application since you read it.

Your application should reread the record prior to resending an Update or Delete operation.

81 LOCK ERROR

This error can result from any one of two conditions.

- The Btrieve lock table was full. Decrease the number of locks that your application uses or reconfigure NetWare Btrieve and specify a higher value for the Maximum Number of Record Locks configuration option.
- The application tried to unlock one record that was locked with a multiple record lock, and the record position stored in the data buffer did not correspond to any record that was locked in that file.

82 LOST POSITION

When performing a Get Next or Get Previous on a key with duplicates, the application tried to retrieve a record that was deleted or whose key value was modified by another application. Reestablish positioning using a Get Equal or a Get Direct operation.

83 READ OUTSIDE TRANSACTION

The application tried to delete or update a record within a transaction, but the record was not read within the transaction. If you are going to update or delete a record within a transaction, you must first read the record within the transaction to ensure you have obtained exclusive access to the data.

84 RECORD LOCKED

The application tried to apply a no-wait lock on a record that was currently locked by another application or to apply a no-wait lock on a file while another application held active record lock(s) in that file.

If this status code is returned, your application can use either of the following two methods:

- Retry the operation until it is successful. Under light-to-moderate network use, this may be the simplest and quickest solution.
- Use the wait option (+100/+300) instead of the no-wait option.

85 FILE LOCKED

The application tried to apply a no-wait record or file lock while another application held the file locked. This status code is also returned when the application tries to open a file outside of a transaction and the file is locked by some other application.

If this status code is returned, your application can use either of the following methods:

- Retry the operation until it is successful. Under light-to-moderate network use, this may be the simplest and quickest solution.
- Use the wait option (+100/+300) instead of the no-wait option.

86 FILE TABLE FULL

Btrieve's file table is full. Reconfigure NetWare Btrieve and specify a higher value for the Maximum Number of Open Files configuration option.

87 HANDLE TABLE FULL

Btrieve's handle table was full. Reconfigure NetWare Btrieve and specify a higher value for the Maximum Number of File Handles configuration option.

88 INCOMPATIBLE MODE ERROR

The application tried to open a file in an incompatible mode. If the first application to access a file opens it in accelerated mode, all other applications must open it in accelerated mode. If the first application to access a file opens it in non-accelerated mode, other applications cannot open the file in accelerated mode.

90 REDIRECTED DEVICE TABLE FULL

The Btrieve requester's redirection table or server routing table is full. This occurs if you attach to additional servers or map to additional drives after you loaded BREQUEST. Reload BREQUEST, specifying a larger number for the Number of File Servers or Number of Mapped Drives configuration options (/S and /R, respectively).

This error also occurs if you detach a particular server and attach to a different server. Once a workstation has attached to a server, BREQUEST will not remove its name from the server routing table.

91 SERVER ERROR

BREQUEST could not establish a session with the server. Either the NetWare Btrieve Record Manager has not been started or the server was not active.Verify that NetWare Btrieve is active on the server in question.

92 TRANSACTION TABLE FULL

The maximum number of active transactions was exceeded. Reconfigure NetWare Btrieve and specify a higher value for the Number of Concurrent Transactions configuration option.

93 INCOMPATIBLE LOCK TYPE

Your application tried to mix single record locks (+100/+200) and multiple record locks (+300/+400) in the same file at the same time. All locks of one type must be released before a lock of the other type can be executed.

94 PERMISSION ERROR

Your application tried to open or create a file in a directory without the proper privileges. Btrieve does not override the network privileges assigned to users.

95 SESSION NO LONGER VALID

The previously established session was no longer active due to an error at the workstation, the file server, or on the network. Verify that your workstation is still attached to the file server and then reload the Btrieve requester.

This status is also returned if the maximum number of sessions for NetWare Btrieve has been reached. When using NetWare Btrieve in the 286 environment, use the console command B STATUS to check whether the maximum number of sessions has been reached. When using NetWare Btrieve in the 386 environment, use the Status option of the Available Options menu of the BCONSOLE utility to check whether the maximum number of sessions has been reached. If so, reconfigure NetWare Btrieve to increase the number of available sessions.

96 COMMUNICATIONS ENVIRONMENT ERROR

This code occurs when loading Btrieve on a NetWare server. The SPX connection table is full. Reload SPX, specifying a higher value for the connection table. Refer to the NetWare system documentation for more information.

97 DATA MESSAGE TOO SMALL

Your application tried to read or write a record that was longer than NetWare Btrieve or the Btrieve requester could handle. Reconfigure the Btrieve Record Manager and specify a higher value for the Maximum Record Length configuration option. Reload the requester and specify a higher value for the /D option.

- For an Update, Insert, or Create operation, the application receives this error if the data buffer length it specifies for the record exceeds the length specified for the Btrieve Record Manager or BSERVER.
- For a Get, Step, or Stat operation, the application receives this error if the value specified for the data buffer length is shorter than the length of the data Btrieve would return, regardless of the data buffer length specified in the program.

98 INTERNAL TRANSACTION ERROR

An error has been detected while executing a previous operation on a NetWare TTS file. Therefore, no operation other than Abort Transaction (21) is allowed at this point.

DOS REQUESTER ERROR MESSAGES

BREQUEST can return the following error messages when it loads at a DOS workstation.

INCORRECT NETWARE VERSION

The NetWare version loaded is incompatible with the version of BREQUEST that is loaded. The NetWare shell for NetWare v2.1*x* or above must be installed at the workstation.

INCORRECT PARAMETER

An illegal parameter was specified. For information on starting BREQUEST and a list of valid options, see Chapter 3, "Installation."

INSUFFICIENT MEMORY

BREQUEST cannot allocate enough memory for the parameters specified. Make sure that the workstation has enough memory to load all the programs it requires.

MUST HAVE DOS 2.00 OR GREATER

BREQUEST requires DOS v2.00 or above.

PROGRAM ALREADY LOADED

BREQUEST is already loaded.

REDIRECTION LIST NOT LARGE ENOUGH

BREQUEST cannot store all the redirected devices in its redirection list. Reload BREQUEST and specify a higher value for the /R option.

SERVER ROUTING LIST IS NOT LARGE ENOUGH

There are more NetWare Btrieve VAPs on the network than BREQUEST has configured in the server list. Reload BREQUEST and specify a higher value for the /S option.

SPX IS NOT LOADED

The NetWare SPX communications software must be loaded before BREQUEST can be loaded.

OS/2 REQUESTER ERROR CODES

The Btrieve requester can return the following runtime error codes at an OS/2 workstation.

2001 INSUFFICIENT MEMORY

The requester cannot allocate enough memory for the parameters specified with the BRQPARMS environment variable. Reduce the size of the /D option.

2002 PARAMETER INVALID OR OUT OF RANGE

One of the parameters specified with the BRQPARMS environment variable is either invalid (such as /P instead of /D) or the value specified for a parameter is out of range. Check the SET BRQPARMS statement to make sure that it is correct.

2003 NO LOCAL ACCESS ALLOWED

The application attempted to access a file stored on a local drive. The version of BTRCALLS.DLL installed at the workstation does not allow access to local files.

2004 SPX IS NOT INSTALLED

Install the NetWare SPX communications software for OS/2.

2005 WRONG VERSION OF SPX INSTALLED

Install SPX v2.0 or greater.

2006 NO AVAILABLE SPX CONNECTION

SPX has already established the maximum number of sessions (15) it can handle.

MS-WINDOWS REQUESTER ERROR CODES

The Btrieve DPMI DLL can return the following error codes.

1013 TASK TABLE FULL

Increase the number of available task entries using the tasks initialization option ("tasks=xxx") under the [BTRIEVE] or [BREQUESTDPMI] headings in WIN.INI. The minimum value for this parameter is 1; the maximum value is 255.

2001 INSUFFICIENT MEMORY

The requester cannot allocate enough memory for the parameters specified with the WBTRVINIT function call. Either reduce the size of the /D option or free more memory by terminating other applications.

2003 NO LOCAL ACCESS ALLOWED

The application attempted to access a file stored on a local drive. The version of WBTRCALLS.EXE (or WBTRCALLS.DLL for Windows v3.0 and above) installed at the workstation does not allow access to local files.

2007 NO WINDOWS AVAILABLE

The maximum number of applications accessing the requester concurrently has already been reached. The MS-Windows requester can handle a maximum of 10 active applications.

BSERVER AND BROUTER ERROR MESSAGES

If either BSERVER or BROUTER encounters an error during initialization, it will display a message on the screen and will not load. You may receive the following messages when a VAP that uses Btrieve is loaded at the file server.

INSUFFICIENT MEMORY FOR PARAMETERS SPECIFIED

One possibility is that BSERVER cannot allocate the minimum number of buffers required. Reduce the page size. Another possibility is that your server does not have enough available memory to load BSERVER at the requested size. You may need to add more memory to your server.

UNABLE TO ACCESS FILE FOR TRANSACTION RECOVERY

One possibility is that Btrieve cannot open one of the files involved in an incomplete transaction. Verify that all files involved in the transaction are online and restart the network.

Another cause for this message is that an I/O error occurred when Btrieve attempted to read from or write to one of the files. In order to recover an incomplete transaction, Btrieve must read and write the header record in each of the files involved in the transaction. The file may have been damaged. Check for media failure and replace all Btrieve files in the transaction with their most recent backups.

UNABLE TO ALLOCATE BROUTER BUFFER MEMORY

BROUTER cannot allocate the amount of memory specified for the data message length. Use BSETUP to reconfigure and reinstall the Btrieve VAPs, specifying a smaller value for the data message length.

GLOSSARY

Access path: *See* index path.

Alternate collating sequence: A sorting sequence other than the standard ASCII sequence that specifies the order in which Btrieve will sort a key.

Application interface: A program that allows access to Btrieve files from an application program.

ASCII: An acronym for American Standard Code for Information Interchange. ASCII is a standard 7-bit information code that defines 128 standard characters, including control characters, letters, numbers, and symbols.

Cache: The area of memory where images of physical disk pages are stored. The cache is used to reduce physical disk I/O requests.

Concurrency controls: The methods provided by Btrieve to resolve possible conflicts when two applications attempt to update or delete the same records at the same time. Concurrency controls include passive control, transaction control, and record locking.

Currency: The previous, current, and next position of a record in a file. There are two types of currency: logical and physical. The physical previous, current, and next positions form the physical currency. The logical previous, current, and next positions form the logical currency.

Database: A set of one or more consecutive records or files on a related subject.

Description file: Sequential file containing information necessary for the BUTIL –CREATE, –INDEX, and –SINDEX commands.

Descriptor: The data buffer parameter passed for an Extended Get or Extended Step operation.

Directory: A disk structure that contains files. A directory may also contain other subdirectories.

DOS: Either the MS-DOS or PC-DOS operating system.

Duplicate key: An attribute associated with a key field that allows a single key value to identify more than one record within the file that contains that value.

FCR: *See* file control record.

Field: A storage area within a record that constitutes an item of information.

File: A collection of related records.

File control record: The first page in a file that contains the file's size and other characteristics.

Index: An ordered set of keys. A file can have more than one index.

Index path: A logical ordering of records in a Btrieve file based on the values of an index. There is an index path for each index in a file. A file may have up to 24 separate index paths.

Integrity control: The method used to ensure the completeness of files. Specifically, Btrieve uses pre-imaging and NetWare 's Transaction Tracking System to guarantee integrity.

Internetwork: Two or more separate, independent networks joined by a communications bridge. The bridge enables the file servers in separate networks to access each other's data.

Key: An identifier used to identify the position of the record within an index path. The keys in an index are ordered according to a specific collating sequence. A key takes its value from the area in a record corresponding to its predefined offset and length.

Key field: A field Btrieve uses to identify specific records.

Key number: An identifier associated with a specific key field in a file.

Manual key: A modified form of the null key that can be used to exclude particular records from an index.

Modifiable key: An attribute associated with a key field that allows the value of the field to change during updates. Otherwise, key field values are not allowed to change.

Multi-threading: The process of executing more than one operation at the same time.

Null key: A key field that allows the value of the field to be a user-defined null character. For null keys, Btrieve does not index a record if the record's key value matches the null value.

Operation: A specific action (Delete, Create, Get Equal, and so on) that manipulates a Btrieve file.

Page: A unit of disk storage containing a multiple of 512 bytes, no greater than 4096 bytes. A page is the smallest unit of storage that Btrieve moves between main memory and disk.

Partitioned file: A logical Btrieve file composed of two separate physical disk files. This allows Btrieve logical files to be larger than the physical disk.

Positioning: Establishing the current location within an index path following the successful completion of an operation.

Pre-imaging: The process of storing the image of a file page before a record on the page is updated. Btrieve uses pre-imaging to provide recovery capabilities in case a file is damaged or in the event of a system failure during an operation.

Primary file: The original part of a partitioned file before a BTRIEVE extend operation was performed.

Record: A set of one or more consecutive fields about a related subject, such as an employee's payroll record.

Record Manager: The part of Btrieve that transfers logical records between their physical disk location and an application program.

Segmented key: A key field that allows the key to have noncontiguous parts. That is, noncontiguous data in a record can constitute a single key.

Sibling networks: Two or more co-equal networks branching off the same node in an internetwork. Workstations on these networks that use NetWare Btrieve must have access to a file server loaded with BSERVER.

Transaction: A set of logically related Btrieve operations.

Value-Added Process (VAP): A process that resides in a file server and uses the NetWare protocols to efficiently access server files.

INDEX

B

B ACTIVE, 4-2
B DOWN, 4-3
B OFF, 4-4
B RESET, 4-5
B STATUS, 4-6
B USAGE, 4-8
BCONSOLE
  Active Files option, 4-9
  Change Current File Server option, 4-9
  overview, 4-9
  Resource Usage option, 4-10
  Status option, 4-11
  VAP User List option, 4-12
BREQUEST
  error messages (DOS), A-17
  running on DOS workstations, 3-13
BROLLFWD
  command format, 4-14
  overview, 4-12
  running the utility, 4-14
  specifying logging, 4-12
BROUTER
  communicating with BSERVER, 2-5
  error messages, A-20
  Get Interrupt Vector function, 2-5
  overview, 2-2
  stopping BROUTER, 3-17
BRQPARMS variable, 3-14
BSERVER
  accessing from a client-based application, 2-3
  accessing from a server-based application, 2-5
  error messages, A-20
  overview, 2-1
  stopping BSERVER, 3-17
BSETUP
  Available Options menu, 3-3
  Change File Server menu option, 3-4
  exiting, 3-3
  Install Btrieve menu option, 3-9
  Remove Btrieve menu option, 3-11
  Save Configuration menu option, 3-9
  Set Configuration menu option, 3-4
  starting, 3-3
Btrieve. *See* NetWare Btrieve

C

Communications
  BROUTER, 2-2
  requester, 2-2
  server, 2-1
Configuration options
  Console Refresh Count, 3-8
  Create Files as Transactional, 3-9
  Largest Compressed Record Size, 3-7
  Largest Page Size, 3-8
  Largest Record Size, 3-8
  Logging of Selected Files, 3-9
  Number of Files Per Transaction, 3-7
  Number of Handles, 3-6
  Number of Locks, 3-6
  Number of Open Files, 3-6
  Number of Sessions, 3-8
  Number of Transactions, 3-7

Connection number, 4-5
Console commands
  B ACTIVE, 4-2
  B DOWN, 4-3
  B OFF, 4-4
  B RESET, 4-5
  B STATUS, 4-6
  B USAGE, 4-8
  overview, 4-1
Console Refresh Count
    configuration option, 3-8
Create Files as Transactional
    configuration option, 3-9

D

/D option, 3-12
Data Message Length option, 3-12
Data recovery, 1-4
DOS workstations
  requester error messages, A-17
  starting BREQUEST, 3-13

F

File size
  maximum number of bytes, 1-3
  maximum number of records, 1-3
Flow of control, between Btrieve
    and application, 2-2

L

Largest Compressed Record Size
    configuration option, 3-7
Largest Page Size configuration
    option, 3-8
Largest Record Size configuration
    option, 3-8
Least recently used algorithm, 1-4
Logging of Selected Files
    configuration option, 3-9
Logging, 1-4
LRU algorithm, 1-4

M

Mapped Drives option, 3-12
Memory management, 1-3
MS-Windows, requester, 3-15
MS-Windows workstations
  requester, 3-15
  requester error codes, A-19

N

NetWare Btrieve
  configuration options, 3-4
  configuring and installing, 3-1
  features, 1-3
  installing NetWare Btrieve, 3-9
  network configuration, 2-4
  overview, 1-1
  removing from a file server, 3-11
  saving the configuration, 3-9
  specifying configuration options,
      3-3
  system requirements, 3-2
  utilities, 1-5
NetWare operating system
  DOWN command, 3-17
  ELS NetWare Level I, 3-2
  version required, 3-2
Network configuration diagram, 2-4
Number of File Servers option, 3-13
Number of Files Per Transaction
    configuration option, 3-7
Number of Handles configuration
    option, 3-6
Number of Locks configuration
    option, 3-6

Number of Open Files configuration option, 3-6
Number of Sessions configuration option, 3-8
Number of Transactions configuration option, 3-7

O

OS/2 workstations
  BRQPARMS variable, 3-14
  initializing requester program, 3-14
  installing requester program, 3-13
  requester error codes, A-18
  SET command, 3-14
  starting the requester, 3-13

R

/R option, 3-12
Recovering files, 4-12
Requesters
  communicating with BSERVER, 2-2
  Data Message Length option (/D), 3-12
  DOS workstations, 3-13
  error codes (MS-Windows), A-19
  error codes (OS/2), A-18
  error messages (DOS), A-17
  Mapped Drives option (/R), 3-12
  memory requirements, 3-2
  MS-Windows workstations, 3-15
  Number of File Servers option (/S), 3-13
  OS/2 workstations, 3-13
  overview, 2-2
  start-up options, 3-12
    /D, 3-12
    /R, 3-12
    /S, 3-13
  stopping, 3-16
Resource usage, 4-10

S

/S option, 3-13
Server communications, 2-2
Server-based applications, 1-1
Start-up options, 3-12
Status codes, A-1
System requirements, 3-2
  server memory, 3-2
SET command, OS/2 workstations, 3-14

U

Utilities
  BCONSOLE, 4-9
  BROLLFWD, 4-12

V

VAPs
  communications, 2-5
  creating, 2-5
  user list, 4-12

W

Workstations
  memory requirements, 3-2
  releasing resources using B RESET, 4-5

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